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No. 3

USE AND PREPARATION OF FOOD

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FOREWORD.

The period of reconstruction, even more than the period of the war, throws a great responsibility upon the women of our country. Three great food problems face the American housekeeper to-day: To select and use food so that the problem of maintaining the food supply of the world may be met; to feed her family properly so as to maintain the health and efficiency of its individual members and thereby the welfare of the Nation; and to choose food so that the family income may be wisely used.

In order that the home makers of this country and the girls and women who are to be home makers may have assistance in the solution of these problems, this series of short-unit courses in the use and preparation of food is suggested as a basis for instruction in day, part-time, and evening classes in home economics.

This bulletin has been prepared by the Federal Board for Vocational Education in cooperation with the United States Food Administration, and special acknowledgment is made to Miss Martha Van Rensselaer, in charge of the home conservation division of the Food Administration, and her colleagues for the valuable help and advice which they have given in the preparation of this bulletin.

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C. A. PROSSER, *Director.*

THE USE AND PREPARATION OF FOOD.

PURPOSE OF THE COURSE.

These units are suggested as a basis for practical part-time and evening courses in the use and preparation of food. They are intended to meet the immediate needs of home makers who are daily facing the task of providing adequate food for their families.

USE OF THE COURSE IN THE SCHOOLS.

To put this training within the reach of as many women as possible the public schools should be encouraged to give part-time and evening courses in home making, offering units carefully planned to meet the needs of the women of the community. The State supervisors of home economics should use their influence to stimulate the foundation of these classes whenever there is a group in need of such instruction.

WAYS OF USING THE COURSE.

The course is planned on the basis of short units of from 4 to 10 lessons. This arrangement makes it possible to use the same outline to form courses of varying length and content and to meet the needs of any group of women, even though the women differ in previous training, the subjects in which they are interested, and the amount of time which they are able to devote to the work. The units are so grouped that they form a consecutive course when used together, yet each unit is complete in itself and may be used independently or may be combined with any one or more additional units to form a shorter course. The use of Unit XII, The Housekeeper and the Food Problem, should be especially noted. The teacher should be familiar with the lessons in this unit, since a knowledge of their content is essential in the successful presentation of any unit in the course. The subject matter contained in them or any part of it may be used in any of the following ways:

1. As an introductory lesson in a unit.
2. As general information, given as a part of each lesson, as fitness demands.
3. As part of a final or summarizing lesson in a unit.

4. As a complete independent unit offered for women who have had previous training in the subject.

5. As a final unit in the complete course.

For part-time classes offering 144 hours of instruction in foods, the entire outline may be used and will be found to provide sufficient material for a course of that length. For these classes, also, the flexibility of the course should be kept in mind and certain lessons expanded or others omitted so as to meet the especial interests and needs of the women.

For evening classes any unit or group of lessons may be used, depending upon the needs and desires of the women and the time at their disposal.

For classes of foreign women the lessons will have to be greatly modified. The modification should be based upon a thorough study of the food habits of each group and a sympathetic understanding of their prejudices or religious restrictions. Palatable substitutes and American methods should be suggested but not imposed upon them. Good foreign recipes should be collected and used. Only changes should be taught which are essential from the standpoint of health and economy.

QUALIFICATIONS OF INSTRUCTORS.

The qualifications of instructors should be determined in each State by the standard for teachers of part-time and evening classes in home economics. In addition to practical experience and technical and professional training, the teacher of part-time and evening classes must have a special interest in part-time education and ability in dealing with its problems. The teachers may be obtained principally from two sources:

1. Teachers of home economics in public schools.

2. Women carefully selected for their wide practical experience in home making and preferably those who have had successful teaching experience.

It is important that the instructors not only know the subject in hand, but that they have sufficient training to present the material in an effective manner. For groups without such training special-methods classes may be provided or methods may be offered to women with other required qualifications as a part of the itinerant teaching of the State supervisor.

QUALIFICATIONS FOR ADMISSION TO UNITS.

Beyond the practical experience which women seeking such training will probably have had, no special qualifications are necessary for admission to units. It is best for efficient work that the

members of a class be of nearly the same age and preferably of approximately the same ability.

METHODS OF RECRUITING CLASSES.

Careful preliminary work should be done in organizing classes for part-time and evening work. No course will be successful which does not meet the specific needs of the group for whom it is offered. Knowledge of these needs can only be obtained by a thorough preliminary survey. For the actual recruiting of classes, the following means are suggested:

1. Enlisting the interest of local organizations which are in touch with women.
2. Enlisting the interest of men or women who have influence with the group to be reached.
3. Enlisting the interest of school children in getting their mothers to attend such classes.
4. House-to-house canvass conducted by a person chosen for her ability to interest the group to be reached.
5. Newspaper announcements of the proposed course.
6. The use of a certificate or some recognition for the completion of a definite amount of work. This encourages attendance and serves to standardize the amount and kind of work done.
7. Posters.
8. Dodgers.

METHOD OF CONDUCTING A UNIT.

Individual laboratory work will be required where the course is given as a part of the vocational education work in a school aided by Federal funds. It is desirable that individual laboratory work be required in every class whenever it is possible to obtain equipment for it. When equipment is provided the work will take the form of class practice, supplemented by demonstrations, lectures, and class discussions. If laboratory facilities are not available for the use of the class, the work may be presented through demonstrations by the teacher, supplemented by lectures and class discussions. In all cases a certain amount of home work should be required, in order to connect the class work with home conditions. Suggestions for home work have been included in the units in connection with the "Methods for developing laboratory work."

ORDER OF LESSONS.

The order of the lessons in this course has been planned for the woman who is to take the whole course. The units have been worked out on the basis of the principles involved in preparation.

In case the women want only one or two units of work, special grouping of lessons, such as those suggested below, may be desirable. These are only suggestive, and any other combinations especially adapted to local condition may be used. This may demand some change in the lesson so as to fit it for use in the special unit.

Lessons may be organized into units on the basis of meals for the day. In this case their arrangement may be made from several points of view.

1. The meal may be made the subject of the unit and each lesson take up the preparation of some suitable food for the meal, concluding with a lesson in which meals of various costs are prepared and served. The following outline gives some suggestions for the use of lessons in carrying out this order:

LUNCHEONS AND SUPPERS.

Lesson I. Soups:

Cream soups, Unit I, Lesson 1.

Some good soups from peas and beans, Unit III, Lesson 2.

Lesson II. Main dishes:

Macaroni, Unit I, Lesson 4.

Peas and beans, Unit III, Lesson 1.

Nuts, Unit III, Lesson 3.

Cheese, Unit IV, Lesson 5.

Left-over meats, Unit VI, Lesson 5.

Lesson III. Vegetables:

New and practical ways of using vegetables, Unit II, Lesson 5.

Lesson IV. Salads:

Salads and salad dressings, Unit V, Lesson 5.

Lesson V. Desserts:

Custards and custard puddings, Unit IV, Lesson 3.

Frozen desserts from milk and cream, Unit IV, Lesson 4.

Water ices, Unit VIII, Lesson 5.

Gelatin desserts, Unit VIII, Lesson 4.

Lesson VI. Planning and preparation of luncheons and suppers at stated costs.

The same plan can be used in arranging units for teaching the preparation of breakfasts and dinners.

2. A meal may be prepared at each meeting of the class. This is frequently done when the class is made up of a group of working girls who wish to prepare their evening meal. In this case the menus must be made out in advance and the material selected from the lessons, including the dishes desired. The groups must be small enough to insure that one dish is prepared by each two students, and should be varied from week to week to cover as many typical dishes as possible. Definite account must be taken of the dishes prepared by

each individual so as to vary her experience, and all the students should observe each other and so profit by the work the others are doing.

3. A unit may be offered on the basis of simple meals for light housekeeping. The lessons should be given with equipment any working girl can have in her own room, taking into consideration the usual conditions to be met.

The following lessons are suggested:

Lesson 1. A simple breakfast.—Fruit and cereal or toast and marmalade, or pancakes; coffee or cocoa.

Lesson 2. More elaborate breakfasts.—Plan breakfasts containing heavier dishes, as eggs, creamed meats, creamed dried beef or codfish, or broiled bacon.

Lesson 3. The lunch to be taken to the office.—With lunch box containing thermos bottle. Sandwiches, fruit, beverage—milk, soup, cocoa, coffee, or tea.

Lesson 4. The supper at home.—Soup or eggs or creamed dish, or rarebit; salad, dessert.

Lesson 5. Dinner on two burners.—Chop, potato or rice, green vegetable, dessert.

Lesson 6. Planning the menu for a day. (See Unit X, Lesson 8.)

The following unit outlines a possible arrangement for a class interested in meals for children.

UNIT ON SUITABLE MEALS FOR CHILDREN.

Lesson 1. Milk and its value in the diet, Unit IV, Lesson 1.

Lesson 2. Use of fruit in the diet—preparation of dried fruit, Unit II, Lessons 1 and 2.

Lesson 3. Cereals, Unit I, Lessons 2 and 3.

Lesson 4. Cooking eggs and custards, Unit IV, Lessons 2 and 3.

Lesson 5. Preparation of potatoes and other vegetables, Unit II, Lessons 3 and 4.

Lesson 6. Cream soups, Unit I, Lesson 1.

Lesson 7. Preparation of meals for children under school age, Unit XI, Lesson 2.

Lesson 8. Preparation of meals for the school child, Unit XI, Lesson 3.

EQUIPMENT.

The equipment necessary varies somewhat with the different units. Where a laboratory is available, the regular equipment for the preparation of food will be satisfactory if this provides individual equipment for each member of the class. If a laboratory can not be obtained, and if the class is not too large, the work may be carried on in a home kitchen.

In addition to the general equipment, the teacher should see that helpful illustrative material is provided which will aid the students in getting a clear grasp of the work. Exhibits of foods in various stages of manufacture, pictures illustrating the production or the manufacture of foods, charts, posters, and samples of food materials not generally obtainable on the local market will all be of help in presenting subject matter effectively. Frequently a small exhibit setting forth the principal points of a lesson and kept before the student during the lesson period makes a much deeper impression than the same information given by word of mouth.

REFERENCE MATERIAL.

For the use of the teacher, in addition to that given in the bibliographies following each unit, the following reference material is suggested:

1. Free publications of the various departments of the Government, particularly the United States Department of Agriculture, Washington, D. C., the Federal Board for Vocational Education, Washington, D. C., and the extension departments of the State agricultural colleges. The teacher should have her name placed on the mailing lists of these agencies to receive publications relating to home economics. She should also have a copy of the complete list of publications of the Department of Agriculture in order to note not only the Farmers' Bulletins but also those listed as "professional papers" and "department bulletins." The bulletins of the various bureaus of the Department of Agriculture, such as the Bureau of Markets, the Bureau of Animal Industry, and the Bureau of Plant Industry, also issue material of value to home economics teachers. It is frequently worth while to obtain a copy of a Government or extension bulletin on a particular subject for each member of the class. Bulletins may be obtained in quantity through the Congressman or Senator from each State.

The publications of the United States Food Administration are no longer being distributed, but where the supply received during the war period is still available they should be used as references.

2. Standard books relating to foods.—These should be obtainable at a public library, or if no public library is at hand, they may be borrowed from the State library or from the United States Department of Education at Washington, D. C.

3. Current newspaper and magazine articles.

4. Pictures.

5. Stories.

It is important that the teacher keep her instruction and information up to date, and that she use every method to make the lessons of real aid in solving the food problems of the members of her classes.

UNIT I.

The Preparation of Some Simple Foods.

GENERAL INFORMATION.

The cereals are the simplest, the most available, and cheapest sources of food we have. Any interference with the grain crop of a nation is likely to be followed by famine.

The cereals most used for food are: Wheat, corn, oats, rye, rice, and barley.

Their food value is so similar that from the standpoint of composition the cereals may be used almost interchangeably in the diet. Custom and availability have brought about inequalities in use in different countries and parts of countries. For example, wheat is the staple cereal of parts of America and Europe: corn has a larger place in the diet in some of the Southern States and Mexico; rice in the Asiatic countries and Pacific islands.

The very extended use of wheat in Europe and America is due to the fact that such a large part of the cereal in our diet is taken in the form of bread, and the bread-making power of wheat is greater than that of any other cereal. This explains the emphasis upon wheat during the war period.

The urgency of the wheat situation at that time was due to:

1. A succession of short crops in America.
2. The necessity of America furnishing wheat to other countries whose ordinary sources of supply were temporarily cut off by—
 - A. Decreased production.
 - B. Lack of available shipping space for long hauls.
3. Losses from submarine sinking.

During the winter of 1917-18 there was a large supply of other cereals available, especially corn, so restrictions were put on the sale of wheat, forcing the individual to buy other cereals with wheat. This whole campaign was valuable in that it taught us many possible uses of the other cereals.

Since the signing of the armistice all restrictions on the sale of wheat have been removed. The reasons for this are:

- (1) The unusually large crop of wheat in 1918.
- (2) The release of shipping, which makes large stores of wheat in India, Australia, and South America available.
- (3) The shortage this year of cereal crops other than wheat, which makes it necessary to use all cereals wisely.

From the standpoint of the total food of the world it is advisable that we continue the increased use of cereals other than wheat which we learned during the war.

LESSON 1. PUDDINGS, CREAM SOUPS, AND CREAM TOAST.

AIM.

To teach action of moist and dry heat on starch and proportions of starch to use for thickening.

POINTS TO BE BROUGHT OUT.

1. Food value:

A. Starch is a *carbohydrate* or fuel food which is found in most vegetable foods. It is especially abundant in the cereals and potatoes. When isolated it is a fine white powder. The separate grains may be seen under the microscope and are distinctive in shape according to the source.

2. Use of starch as a thickening agent—action of moist heat on starch.—When starch is heated with water it absorbs the water and swells up, or, as we say, gelatinizes, and the liquid is thickened by the swollen starch grains. We determine the degree of thickening by the proportion of starch to liquid used.

A. Kinds of starch ordinarily used:

- Wheat flour (most frequently used).
- Cornstarch.
- Corn flour.
- Rice flour.
- Potato flour.
- Tapioca flour.
- Arrowroot flour.

B. Proportions of liquid to wheat flour used in mixtures of typical consistency:

	Liquid.	Wheat flour.
Cream soups.....	1 cup.....	1 tablespoon.
Cream sauces.....	.....do.....	2 to 3 tablespoons.
Puddings.....	.....do.....	1/2 tablespoons.

C. Variations in proportions with the kinds of starch or flour used depend upon:

(1) Percentage of starch in product used (comparison of wheat flour with wheat starch: wheat flour contains only 75 per cent starch, while wheat starch is practically 100 per cent starch).

(2) Thickening power of starches from different sources (compare any pure starches available, for example, cornstarch and arrowroot; the same proportions give products of different consistencies).

D. Method of combining starch with liquid to prevent lumping.—When starch is added to hot liquids it tends to stick together in small lumps. The starch grains on the outside cook quickly and inclose in the interior uncooked grains of starch. This may be avoided by separating the grains of starch before combining with some other material. This may be accomplished by—

- (1) Mixing with sugar or any dry, finely ground solid.
- (2) Mixing with a small amount of cold liquid.
- (3) Mixing with fat.

The method used in a given recipe depends upon the other necessary ingredients.

E. Choice of starch:

- (1) All starches are probably equally digestible.
- (2) Some tend to retain the raw starch flavor more than others, and therefore require a longer cooking (i. e., cornstarch).
- (3) The choice is usually determined by the availability, cost, and ease of cooking.

F. Proportions used in typical dishes made from combinations of milk and starch:

1. Starch puddings:

A. Proportions.—One cup milk, 2 tablespoons sugar, flavoring, 4 tablespoons flour (or equivalent in other starch).

B. Method of combining.—The flour is combined with the sugar, or is mixed with a small amount of cold liquid, then added to the hot liquid. Cook until starch is thoroughly done. After bringing to boil over fire the cooking may be completed in a double boiler.

C. Ways of serving.—Pour into a large mold or individual molds. Serve with cream, custard, or fruit. The pudding may be turned out of the mold when served, since it is sufficiently stiff to hold its shape.

2. Cream sauces:

A. Proportions.—Medium sauce.—1 cup liquid, 2 tablespoons flour, 2 tablespoons fat, salt, pepper.

Thick sauce.—Increase the flour to 3 or 4 tablespoons, depending upon use to which sauce is to be put. Keep other constituents the same.

B. Method of combining.—Melt the fat, stir in the flour and seasoning; add the milk slowly, stirring constantly, and cook until thick and the starch well done.

C. Uses.—Thin sauce is used with potatoes or very starchy vegetables. Medium sauce is used for creamed vegetables, creamed meats,

or escalloped dishes. Thick sauce is used for the foundation of soufflés or for combining croquette materials.

3. Cream soups.—Cream soups are a combination of milk and vegetable pulp, thickened to the consistency of thin cream:

A. Proportions.—One cup liquid (combination of milk and vegetable pulp), 1 tablespoon flour, 1 tablespoon fat, salt, pepper, and other flavoring. The amount of flour varies with the thickness of the vegetable pulp. With the starchy vegetables, the amount may be decreased. Some flour is necessary ($\frac{1}{2}$ teaspoon to 1 cup liquid) to bind the mixture and prevent the vegetable pulp from settling to the bottom.

B. Method of combining.—Same as for cream sauce or as indicated under methods of combining starch.

4. Action of dry heat on starch—toasting bread. When dry heat is applied to starch it is browned and changed chemically to a substance called dextrin. This is the first stage in the digestion of starch. Bread so prepared is more readily digested than the untoasted bread.

METHOD OF DEVELOPING LABORATORY WORK.

Have puddings prepared, using the different kinds of starches and compare the consistency. These can be prepared in family amounts and taken home for service. A small amount should be molded for comparison during the class period. Use different flavors, as vanilla, caramel, maple, and chocolate. Suggest the addition of nuts and raisins.

The toast can be prepared as croûtons for service with the cream soup, or white sauce may be prepared and served over the toast as cream toast, or creamed dried beef or codfish may be served on toast. In case the women are not interested in the preparation of the white sauce, only the proportions may be discussed and the sauce prepared later as it is needed for the vegetable lesson and others.

All women will be interested in the cream soups. Show that these may be seasoned with the water discarded in cooking vegetables and left-over vegetables. Have soups prepared from vegetables with varying amounts of thickening power. Tabulate results so as to show how the amount of flour added decreases with the thickening power of the vegetable.

CREAM TOAST.

Make 1 cup of medium cream sauce and pour over 3 or 4 pieces of toasted bread. Chopped parsley or grated cheese may be sprinkled over the top. Sections of hard-cooked egg may be heated in the sauce and served on the toast for a breakfast or luncheon dish.

CREAM OF CORN SOUP.

Milk, $1\frac{1}{2}$ cups.	Fat, 1 tablespoon.
Corn pulp, $\frac{1}{2}$ cup.	Salt, $\frac{1}{2}$ teaspoon.
Flour, 1 tablespoon.	Pepper, $\frac{1}{8}$ teaspoon.

Combine as directed for cream sauce. Potato, pea, or bean pulp may be used in the same proportion. Asparagus, lettuce, celery, or spinach may be used by doubling the amount of flour and fat.

CREAM OF CELERY SOUP.

Celery, 3 cups.	Butter, 3 tablespoons.
Water, 1 pint.	Flour, $\frac{1}{4}$ cup.
Milk, $2\frac{1}{2}$ cups.	Salt.
Onion, 1 slice.	Pepper.

Wash, scrape, cut into pieces, and cook celery in boiling water until soft. Rub through a sieve; scald the milk with the onion, remove onion, and add the celery pulp to the milk. Cook flour and butter together and add to celery mixture. Season with salt and pepper.

CHOCOLATE CORNSTARCH PUDDING.

Milk, 1 pint.	Chocolate, $\frac{1}{4}$ square.
Sugar, $\frac{1}{2}$ cup.	Vanilla, $\frac{1}{2}$ teaspoon.
Cornstarch, 4 tablespoons.	Salt, few grains.

Heat the milk, add melted chocolate and sugar. Moisten the cornstarch in a little cold milk; add to hot mixture and cook until thoroughly done; remove from the fire and add vanilla. Serve with plain or whipped cream.

CREAMED DRIED BEEF.

Dried beef, sliced $\frac{1}{4}$ pound.	Medium white sauce, 1 cup.
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Remove skin and separate meat into small pieces. Cover with lukewarm water; let stand 10 minutes and drain. Add white sauce and cook in double boiler 10 minutes.

CREAMED CODFISH.

Salt codfish, $\frac{3}{4}$ cup.	1 egg.
Medium white sauce, 1 cup.	

Soak codfish to remove salt and boil 30 minutes or until tender. Pick into small flakes. (If flaked codfish is used, the above steps should be omitted.) Add codfish to the white sauce. Heat well, and add the beaten egg just before serving.

LESSON 2. BREAKFAST CEREALS.

AIM.

To show the food value and comparative cost of cereal breakfast foods and to give suggestions as to the best methods of preparation.

POINTS TO BE BROUGHT OUT.

1. Food value—Importance of cereals in the diet.—Cereals in some form furnish almost one-third of the food used in the United States. They are important because—

A. They furnish one of the cheapest sources of energy. This is supplied by their high *starch* content, which averages 70 per cent of the grain.

B. They furnish a considerable amount of building material since they contain from 7 to 12 per cent *protein*; 42 per cent of the *protein* of the average diet is furnished by cereals.

C. They contain *mineral matter* and also certain other substances necessary for health and growth. These are found principally in the outer coats and germ of the grain.

D. They furnish desirable bulk in the diet, especially when the coarser or bran-containing cereal preparations are used.

2. Comparative food value of some typical breakfast foods:

A. All the principal grains are used in the preparation of cereal breakfast foods. Generally speaking, they differ very little in composition. Wheat has no advantage over other cereals as a breakfast food for either adults or children except from the standpoint of flavor. The uncooked cereals have more food value per pound than the ready-to-serve cereals. The preparations containing the whole grains furnish more mineral matter than those containing grains with the outer coats removed.

3. Cereal breakfast foods are prepared from the grains. They vary in composition according to:

A. Kind of cereal used.—Oats, wheat, corn, barley, and rice are the ones most frequently used, in the order named. When the whole grain is used, the composition of cereal food corresponds to that of the grain.

B. Part of the grain used.—All grains have three parts: (1) the bran portion, principally cellulose and *mineral matter*; (2) the endosperm portion, which is largely *starch*; and (3) the germ, which contains large amounts of *fat* and *protein*. The rejection of certain parts of the grain in the preparation of breakfast food may bring about greater differences in composition than the selection of different grains.

C. Methods of treatment:

(1) *Milling* determines fineness of division. The composition may be changed in milling by the rejection of certain portions of the grain.

(2) *Steaming* partially cooks the starch and decreases the time necessary for cooking.

(3) *Dry heat* dextrinizes part of the starch. The flaked ready-to-serve cereals have been so prepared.

(4) *Puffed* cereals are prepared by sudden action of heat which hydrates the starch and causes the grain to puff. The dry outer portions are dextrinized.

(5) *Malting and predigesting* have taken place in case of certain cereal preparations.

Composition of typical breakfast cereals.

[Adapted from South Dakota Agricultural Experiment Station Bulletin 168, "Breakfast Foods and Their Relative Value."]

Description.	Water.	Protein.	Fat.	Carbohydrate.	Ash.
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
Rolled Oats	6.55	18.81	7.84	66.93	1.70
Cream of Wheat	8.66	11.00	.91	78.59	.44
Pettijohns	6.96	13.31	2.19	73.81	1.68
Grapenuts	2.75	12.50	.44	81.59	1.38
Corn Flakes	4.32	7.87	.26	85.71	1.38
Puffed Rice	7.18	8.25	.26	83.70	.31

4. Cost of breakfast cereals:

A. Cost is not determined by the food value but by the process of manufacture and the value of the trade name.

B. The uncooked cereals are the least expensive, but the ready-to-serve are sometimes the more convenient. In comparing the cost of the two kinds, the fuel, time, and labor necessary for preparation should be considered.

C. The weight of the contents of the package rather than the bulk should be the guide in economical buying.

Table showing comparative cost per pound of typical breakfast cereals.

[Adapted from South Dakota Agricultural Experiment Station Bulletin 168, "Breakfast Foods and Their Relative Value."]

Kind of breakfast cereal.	Condition.	Price per package.	Price per pound.
		<i>Cents.</i>	<i>Cents.</i>
Rolled Oats	Raw	10	7.2
Cream of Barley	do	15	8.1
Cream of Wheat	do	15	8.6
Pettijohns	do	15	9.9
Cream of Rye	do	15	11.7
Corn Flakes	Ready to serve	10	13.6
Crumbles	do	10	14.9
Grapenuts	do	15	15.8
Shredded Wheat	do	15	19.0
Puffed Rice	do	15	38.0

5. Method of cooking:

A. Cereals require long, slow cooking to soften the fiber, make the starch more digestible, and bring out the flavor. The finer cereal preparations should be cooked from one to three hours, the coarser ones from six to eight hours. There is no danger of overcooking.

Either a double boiler or a fireless cooker is well suited to this purpose.

B. When well cooked and well salted, no sugar is necessary with cereals. If desired, fresh or dried fruits may be served with them.

C. In cooking the finely ground cereals they must be added carefully to the hot water to prevent lumping.

6. Economical use of left-over cereals.—Left-over cereals should never be thrown away. They may be used in any of the following ways:

A. Reheat and serve as cereal. The extra cooking is an improvement.

B. Allow to set in molds and serve cold with fresh or stewed fruit or cream as a dessert.

C. Use as a basis for puddings.

D. Use as a thickening for soups, gravy, or stews.

E. Add to dressing for poultry, rabbits, fish, or meats.

F. Substitute for part of the flour and liquid in muffins or griddle cakes.

G. Combine with meat, cheese, or vegetables in escalloped dishes or baked croquettes.

H. Slice, dip in crumbs or cornmeal, sauté and serve with sirup or fruit sauce.

METHOD OF DEVELOPING LABORATORY WORK.

Have on display the amounts of typical breakfast foods which are equivalent in food value and the cost of each. Let the women compare these and see which cereals give the most food value for the least money.

Let the students compare a cereal cooked overnight with one cooked half an hour and note the difference in texture and flavor. Have on hand some left-over cereal to be prepared in the various ways suggested under 6.

Typical breakfast foods should be prepared following directions on packages.

LESSON 3. RICE, HOMINY, AND BARLEY.

AIM.

To teach the composition, method of cooking, and uses of rice, hominy, and pearled barley.

POINTS TO BE BROUGHT OUT.

1. Composition.—Rice, hominy, and pearled barley are cereals very similar in composition and use.

[Adapted from "Food Products," by Sherman.]

Description.	Water.	Protein.	Fat.	Carbo- hydrate.	Ash.	Calories per pound
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	
Rice, polished.....	12.34	7.18	0.26	79.3	0.46	1,591
Rice, brown.....	11.88	8.02	1.90	76.0	1.15	.....
Pearled barley.....	11.30	8.59	1.1	77.8	1.3	1,615
Hominy.....	11.80	8.3	.6	79.0	.30	1,608

A. Rice:

(1) Polished rice—the form usually found in the market. The bran coat has been entirely removed. This reduces the essential food constituents and should be taken into consideration where the main staple of the diet is rice.

(2) Brown rice—a form which is less generally known. A part of the bran layer is retained, which gives this type of rice more flavor and increases the essential food constituents.

(3) Broken rice—same as the polished rice, only the grains are less perfect, many of them being broken in polishing. The price is lower than that of the perfect grains, but the food value is as high.

B. Hominy grits.—A corn product in which the bran and germ are removed and the grain crushed to varying degrees of fineness. In many parts of the country hominy is confused with samp, which is the whole grain from which bran and germ have been removed, generally by treatment with lye.

C. Pearled barley.—Made from the uncrushed barley grain with the germ and a part of the bran removed.

2. Use in the diet:

A. On account of their coarser form, these products are used not so much as breakfast cereals as a main dish. In using them the following points should be considered:

(1) They furnish energy on account of their high *starch* content.

(2) They are low in *protein*, so should be served with foods high in this constituent.

(3) They are all low in *fat*, and hence this must be supplied from other foods.

(4) When cooked, these products absorb water, so that the composition of the cooked cereal is very similar to that of Irish potatoes, each furnishing about 400 calories per pound. Therefore they are frequently substituted for potatoes in the meal. In making such substitution it must be remembered that these cereals lack the large amount of *mineral matter* which is present in the potatoes, and this must be supplied from other foods.

3. Points to be considered in cooking:

A. Time required.—Varies with the composition, structure, and fineness of division. Rice may be cooked in 20–30 minutes over direct heat, or in half an hour in a double boiler; pearl barley or hominy grits should be cooked six to eight hours in a double boiler or overnight in a fireless cooker.

B. Liquid used.—This may be water, milk, stock, or juice from vegetables, such as tomatoes. Rice, hominy, and barley will absorb four to five times their volume of liquid in cooking.

C. In the case of rice, if it is desired to have the grains separate and distinct, this may be accomplished by:

(1) Cooking in a large amount of rapidly boiling liquid until tender, pouring off the liquid (this contains nutrients, hence should be used for stews, soups, etc.), and steaming for a few minutes.

(2) Cooking in a smaller amount of liquid in a tightly-closed vessel over low fire to prevent scorching. When tender and the liquid absorbed, the cover is removed and the rice allowed to steam until the grains are distinct. Do not stir during the cooking process. There is no loss of nutrients by this method.

4. Suggestions for combining with other foods:

A. These foods are bland in flavor, hence they need to be combined with or served with highly-flavored foods.

B. They are low in fat, hence fat should be added in cooking or in seasoning.

C. They are low in protein; therefore they may be combined with protein-rich foods, such as cheese, meat, or fish.

D. They are low in minerals and essential food constituents; therefore should be served with milk, green vegetables, or fruit.

E. They are soft, hence should be served with crisp foods.

5. Suggestions for serving:

A. As a main dish, combined with meat, cheese, nuts, eggs, or vegetables, escalloped, or made into croquettes or a loaf. Such dishes may be used as meat savers.

B. With butter, as a starchy vegetable or as a substitute for bread. So used they are wheat savers.

C. In soups, to increase their nutritive value.

D. With milk or cream as a cereal (hominy, rice, or barley).

E. Cooked rice, hominy, or barley may be used to take the place of a part of the flour and liquid in breads. (See Lessons 1 and 2.)

F. Rice, hominy, and barley may be used in desserts with fruits, milk, eggs, etc.

G. Hominy may be reheated by sautéing. This increases the flavor.

METHOD OF DEVELOPING LABORATORY WORK.

The different forms of rice, barley, and hominy should be on hand, with price of each. If any of these are not to be obtained on the local market, investigate the possibility of supplying them through local merchants. Compare equivalent amounts of these products and Irish potatoes, discuss the comparative prices and the possibility of substituting the cereals for potatoes when the latter are scarce and high.

The women should cook rice by the two methods suggested and compare the results for (1) nutritive value, (2) appearance, (3) ease in preparation.

Hominy or barley may be prepared beforehand by some member of the class and brought to class to be used in the preparation of the dishes which are demonstrated. Ask to have meals planned in which the main dish is made from rice, hominy, or barley.

HOMINY MEAT CAKES.

Cooked hominy grits, 2 cups.	Salt.
Cooked meat, $\frac{1}{2}$ cup.	Pepper.
Minced onion, 1 tablespoon.	Milk or stock to moisten if necessary.

Form into cakes, brown in fat or brush with melted fat and brown in the oven.

RICE AND SALMON CROQUETTES.

Cooked rice, 1 cup.	Thick white sauce, 1 cup.
Salmon or other fish, 1 cup.	Salt.
Minced parsley, 1 tablespoon.	Pepper.

Combine, form into croquettes, dip in egg and crumbs, and brown in the oven.

SCALLOPED BARLEY WITH TOMATOES.

Cooked barley, 2 cups.	Chopped onions, 2 tablespoons.
Cooked tomatoes, 1 cup.	Butter substitute, 2 tablespoons.
Salt.	Flour, 2 tablespoons.
Pepper.	

Melt the butter substitute. Stir in the flour and seasoning and add the tomatoes and onion. Cook until thick. Pour into a baking dish alternate layers of the barley and sauce, cover with crumbs, and brown in the oven.

HOMINY PUDDING.

Cooked hominy grits, 1 cup.	Coconut, $\frac{1}{4}$ cup.
Milk, 1 cup.	Vanilla, $\frac{1}{2}$ tablespoon.
Sugar, $\frac{1}{4}$ cup.	Salt.
1 egg.	

Bake in individual molds in a moderate oven.

LESSON 4. THE USE AND PREPARATION OF MACARONI AND TAPIOCA.

AIM.

To teach the preparation of macaroni and tapioca and their use in the diet.

POINTS TO BE BROUGHT OUT.

1. Composition.—Macaroni and the wheat pastes are prepared from a flour high in gluten, and are, therefore, higher in *protein* than the average cereal food. Macaroni, spaghetti, and vermicelli differ primarily in the form in which they appear. Tapioca is prepared from an almost pure starch, so its composition is chiefly *carbohydrate*.

[Adapted from "Food Products," by Sherman.]

Description.	Water.	Protein.	Fat.	Carbo- hydrate.	Ash.	Calories per pound.
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	
Macaroni.....	10.3	13.4	0.9	74.1	1.3	1,625
Spaghetti.....	10.6	12.1	.4	76.3	.6	1,620
Tapioca.....	11.4	.4	.1	88.0	.1	1,608

2. Food value:

A. Furnishes considerable amounts of energy, chiefly from the *carbohydrate* present.

B. Building material—

(1) *Protein* is present in considerable amounts in macaroni and wheat pastes. The amount in tapioca is negligible.

(2) The *mineral* is low; therefore, these should be combined with foods high in mineral.

(3) *Fat* is low, so should be added in preparation or service.

(4) Low in essential food constituents.

3. Place in the diet:

A. In combination with protein-high foods, as cheese and eggs, to be served as chief dish of meal.

B. In place of starchy vegetables.

C. With sugar and fruit or egg as dessert.

4. Points to keep in mind in use:

A. They are low in minerals, so should be used with foods rich in minerals, as milk, eggs, cheese, and fruit.

B. They are low in fat, so fat should be added or served in same meal.

C. They are low in flavor, but permit good flavor to carry or extend when added to them.

5. Methods of cooking:

A. Boil to thoroughly cook the starch.

B. Cook in rapidly boiling water to prevent becoming gummy.

C. Combine with flavoring material after starch is thoroughly cooked.

METHOD OF DEVELOPING LABORATORY WORK.

Prepare dishes from the above materials, illustrating the different ways in which they may be used. Compare as to cost and food value with meat-saving, starchy, and dessert dishes.

BAKED MACARONI AND CHEESE.

Milk, 1 cup.	Cooked macaroni, 2 cups.
Fat, 1 tablespoon.	Grated cheese, $\frac{1}{2}$ cup.
Flour, 1 tablespoon.	Salt, 1 teaspoon.

Make a sauce of the milk, fat, flour, and salt. Arrange the macaroni and cheese in alternate layers. Pour over them the white sauce and bake 20 minutes in a moderate oven. Paprika may be added for seasoning.

MACARONI AND TOMATOES.

Macaroni, $\frac{1}{2}$ package.	Tomatoes, 1 cup.
Medium white sauce, 1 cup.	Bread crumbs.
Grated cheese, 4 tablespoons.	Salt and pepper.

Break the macaroni into half-inch pieces and cook in boiling salted water until tender. Drain and blanch. Cover with the white sauce seasoned with salt, pepper, and cheese. Beginning with a layer of macaroni, place alternate layers of macaroni and tomatoes in the baking dish, having macaroni covered with buttered bread crumbs on top. Bake until thoroughly heated through and browned on top.

APPLE TAPIOCA PUDDING.

Pearl tapioca, $\frac{1}{2}$ cup.	Lemon juice, 2 tablespoons.
Boiling water, 3 cups.	5 medium-sized apples.
Sugar, $\frac{1}{4}$ cup.	Salt, $\frac{1}{2}$ teaspoon.

Pick over and wash the tapioca; add the water, salt, and sugar and cook in the double boiler until transparent. Pare and core the apples, or slice them, sweeten if desired; place in a baking dish and pour over them the tapioca to which the lemon juice has been added. Bake until the apples are thoroughly cooked. Serve plain, with sugar and cream, or with whipped cream.

BUTTERED CRUMBS.

1 part fat.	8 parts crumbs.
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Melt fat and stir in crumbs quickly so as to mix evenly.

LESSON 5. BEVERAGES.

AIM.

To teach the use and method of preparation of tea, coffee, chocolate, and cocoa.

POINTS TO BE BROUGHT OUT.

1. Composition:

A. Coffee is an infusion or percolation of the coffee bean, composed of soluble constituents of the bean. The most essential constituents are the stimulating portion (the caffeine) and the volatile oils which give the characteristic odor and flavor. There is also some tannin present, the amount depending upon the method of preparation. For those who like the flavor of coffee, but find its stimulating action harmful, there are decaffeinated coffees on the market. From these the caffeine has been almost completely removed by special commercial processes.

B. Tea is an infusion of the leaf of the tea plant and contains a stimulant (theine), which is the same as caffeine in coffee, and also volatile flavoring substances and tannin. The grade of tea depends upon the kind of leaf used, the most desirable tea, known as flowery pekoe, being made from the youngest bud leaves on the twig; the next grade, orange pekoe, being the leaves next to the bud; and so on. Green tea is made from the tea leaves, steamed and dried. Black tea has passed through a process of fermentation which changes its taste and color.

Comparative composition of green and black teas.

Kind.	Theine.	Tannic acid.
	<i>Per cent.</i>	<i>Per cent.</i>
Green.....	1.7	16.8
Black.....	2.3	15.2

C. Chocolate and cocoa are beverages prepared by the addition of these materials to a liquid, so that the composition of the beverage is a composite of the composition of the two. When milk is used as the liquid, the food value of the beverage is materially increased. Chocolate and cocoa are preparations made from the ground cocoa bean, the principal difference in composition being that chocolate retains a large amount of fat, while approximately one-half the fat is removed from cocoa. There is a small amount of a stimulant (theobromine) in both.

The chemical composition is as follows:

[From "Food Products," by Sherman.]

Material.	Water.	Protem.	Fat.	Carbo- hydrate.	Ash.	Calories per pound.
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	
Cocoa.....	4.6	21.6	28.9	37.7	7.2	2,256
Chocolate.....	5.9	12.9	48.7	30.3	2.2	2,772

2. Use in the diet:

A. Coffee and tea have no food value in themselves, but any food value must come from the sugar and cream which are served with them. They are used in the diet—

- (1) As a stimulant.
- (2) To furnish flavor.

B. Chocolate and cocoa are used—

- (1) For food value.
- (2) To furnish flavor.

C. Danger of depending upon a stimulant.—Coffee and tea are both nerve stimulants which people may easily learn to depend upon and use to the exclusion of other things. They should never be allowed to take the place of articles with real food value.

D. Coffee and tea should never be given to children. They furnish an undesirable stimulant and are liable to be used in place of essential foods, such as milk.

E. Food value depends upon sugar and cream added.

3. Points to be considered in the preparation of coffee:

A. Infusion or percolation.—

(1) The aim should be to extract the soluble flavoring constituents with the smallest percentage of caffeine and tannin.

(2) The flavor is volatile; therefore, long cooking at boiling point should be avoided.

(3) Extraction at a low temperature removes a larger proportion of undesirable ingredients, hence should be avoided.

(4) Quick extraction just below the boiling temperature gives coffee with the best flavor and the least amount of undesirable ingredients.

B. Grinding.

(1) The fineness is important in relation to the method used in making and the percentage extraction desired. Medium fineness is desirable for boiled coffee, finer for drip or percolated coffee.

C. Proportion.

(1) One rounding tablespoonful or two level tablespoonfuls to one cup of water.

D. Methods.

(1) Boiling.—By this method the ground coffee is mixed with a little cold water, the boiling water is added, and the coffee allowed to boil for three minutes, then stand five minutes in a warm place to settle. Crushed eggshell or egg white in the proportion of one eggshell or one teaspoonful of egg white to a cup of ground coffee may be mixed with the ground coffee and serves to clear the beverage. When the liquid coffee is allowed to stand upon the grounds after it is made, a larger proportion of the undesirable ingredients are extracted.

(2) Drip coffee.—Drip coffee is prepared by pouring water at the boiling temperature over pulverized coffee in a thick bag or double strainer in a pot specially prepared to keep the coffee hot. The coffee may be poured through a second time if a stronger brew is desired. The coffee prepared in this way is specially palatable and, according to experiments, is more economical from the standpoint of the amount of coffee required.

(3) Percolated coffee.—This is made in a special pot where the boiling water passes through the ground coffee but does not stand upon it. The strength of the coffee can easily be controlled. This method gives a clear coffee with a good flavor and with a small percentage of harmful substances.

4. Points to be considered in the preparation of tea:

A. Infusion.

(1) Just below the boiling point is desirable for flavor.

(2) Boiling or long standing draws out the tannin, which makes the tea bitter and injures the lining of the stomach.

B. Proportion. One-half teaspoonful tea to one cup of water.

C. Method. Heat water until it boils rapidly, pour over or add the tea leaves, let stand three to five minutes (depending upon the strength desired), and pour off.

5. Points to be considered in the preparation of chocolate and cocoa:

A. How to combine smoothly. (Note the large proportions of fat and starch.)

B. Boiling temperature is necessary to cook the starch present, to thicken the beverage, and to develop flavor.

C. Separation on standing can be prevented in part by thickening with a small amount of additional starch, in the proportion of one-fourth teaspoonful to one cup of liquid. When made with milk, the formation of a scum on top can be prevented by cooking in a covered vessel or beating vigorously with a Dover beater just before serving.

D. The proportions vary with the flavor desired. An average amount is one level teaspoon cocoa or one-fourth ounce square of chocolate to one cup of liquid.

METHOD OF DEVELOPING LABORATORY WORK.

Have on hand samples of tea, coffee, chocolate, and cocoa, showing different grades. Discuss (*a*) fair price, (*b*) grades desirable for general home use, (*c*) economical form in which to purchase for home use: i. e., ground or unground, roasted or green coffee, bulk or package tea, quantity of chocolate or cocoa.

Have the women discuss the methods of preparation they prefer. Using the different methods, each beverage should be prepared, and the results compared.

COCOA.

Mix the cocoa and sugar with a small amount of water and bring to a boil. Add the milk and heat to boiling. Beat to form foam on top.

LESSON 6. THE BREAKFAST MENU.

AIM.

To offer suggestions for the planning of economical breakfast menus which meet the needs of those engaged in different occupations.

POINTS TO BE BROUGHT OUT.

1. Serve as few dishes as possible. This saves time required for preparation.
2. Serve the breakfast attractively. This aids digestion.
3. Suit the kind and amount of food to the needs of those to be served. This avoids waste of left-over food, and does away with the danger of under-nourishment or overeating.

Light breakfast.

Fruit.

Cereal.

Beverage.

Medium breakfast.

Fruit.

Cereal.

Bread and butter.

Beverage.

Heavy breakfast.

Fruit or cereal or both.

One hearty dish, such as
creamed meat or eggs.

Bread and butter.

Beverage.

METHOD OF DEVELOPING LABORATORY WORK.

This lesson should be used as a review lesson, in which the students plan and, if possible, prepare breakfasts which will put into practice the important points of the preceding lessons. Emphasize the opportunities to use cereals intelligently. Stress the use of local products, especially the use of fruit, fresh, canned, or dried. Have the women show how the menus selected could be changed to light, medium, or heavy breakfast, according to the occupation of the people to be served. Have them plan breakfasts for a week for their families, taking into consideration the needs of the different members and considering also the economical use of food, fuel, time, and energy.

REFERENCES.

United States Department of Agriculture:

Farmers' Bulletin 249. Cereal Breakfast Foods.

Farmers' Bulletin 817. How to Select Foods; Cereal Foods.

UNIT II.

Fruits and Vegetables.

LESSON 1. THE VALUE OF FRUITS AND VEGETABLES IN THE DIET: WAYS OF USING FRESH FRUIT.

AIM.

To show the food value of fruits and vegetables in the diet and to suggest appetizing ways of serving fruit.

POINTS TO BE BROUGHT OUT.

1. Composition and nutritive value.—Fruits and vegetables are valuable in the diet because—

A. They contain relatively large amounts of *mineral matter*, especially iron and calcium. Without plenty of fruits and vegetables, the diet is likely to be lacking in these important substances.

B. They contain important dietary constituents, the green leaf vegetables especially being valuable sources of a substance essential for proper nutrition.

C. Most fruits and vegetables contain little *protein*. Many fruits and vegetables contain sufficient *starch* or *sugar* to make them valuable as sources of energy. Potatoes, sweet potatoes, and underripe bananas are about one-fifth starch. Peas, beans, and lentils contain a considerable amount of starch. Both fresh and dried fruits contain sugar. (See Unit II, Lesson 2.)

Average amount of sugar present in some fruits:

	Per cent.		Per cent.
Apricots_____	8. 78	Lemons_____	1. 47
Apples_____	14	Oranges_____	8. 58
Cherries_____	10	Pears_____	8. 78
Figs (fresh)_____	11. 55	Pineapples_____	13. 31
Grapes_____	17. 26	Plums_____	1. 99
Gooseberries_____	6. 40	Raspberries_____	7. 23

D. The olive and the avocado (alligator pear) are high in *fat*, but other fruits contain little or no fat.

E. Most fruits and vegetables have a large amount of *water*. Berries, melons, and the leafy vegetables, such as cabbage or spinach, are more than nine-tenths *water*.

F. The large amount of cellulose present gives bulk to the diet, and, together with certain mild acids, aids in preventing constipation.

G. Both fruits and vegetables are useful in furnishing flavor in the diet and in giving a varied texture to the meals.

2. Amount and kind to be used:

A. Since fruits and vegetables supply substances necessary for health which are not furnished in sufficient quantities in other foods, at least a small amount should be eaten every day, and much larger quantities may be used at seasons when they are abundant and cheap. Leaf vegetables are called "protective foods" because when used in an otherwise restricted diet they furnish the substances necessary for adequate nutrition.

B. Dried fruits are usually more economical than canned fruits and at some seasons of the year are more economical than fresh fruits. Fresh fruit out of season is not only high in price, but often poor in flavor.

3. Ways of using fruits.—Although there are endless variations in the ways of using fruit, the following suggestions will show the general uses:

A. As a preliminary course to a meal the flavor and the acid are an aid to digestion. Fresh fruits or fruit, simply cooked, are suitable for this purpose. In this case they should not be too sweet or the appetite is dulled.

B. As an accompaniment to a meat course.—Cooked tart fruits, such as cranberries, rhubarb, gooseberries, green-apple sauce, or a fruit ice.

C. As a salad. (See Unit V, Lesson 5.)

D. As a sweet with bread.—Stewed dried fruit, preserves, jelly, or jam.

E. In breads, cakes, or cookies.—Fruit muffins, apple-sauce cake, fruit cake, dried-fruit cookies.

F. As a dessert:

(1) Fresh fruit, alone or in combination.

(2) Fresh or cooked fruits in pies and tarts or shortcakes.

(3) Fresh or cooked fruit in gelatin, cornstarch, or tapioca puddings, with bread crumbs or cereal desserts or custards.

(4) Fresh or cooked fruit in ice or ice cream.

(5) In candies.—Fresh fruits crystallized or candied, dried fruits used in candies.

G. Canned, stewed, or dried fruit may be used on breakfast cereals.

4. Points in cooking fruit.—Fruits should be used fresh, unless it is necessary to cook them to soften the cellulose; to cook the starch (in the case of some unripe fruits such as bananas), to improve the flavor, or to preserve them. In cooking the following points should be noted:

A. Sugar and mineral matter of the fruit are soluble. Use only a small amount of water in cooking and serve it with the fruit.

B. Where possible the skins should be retained since they have dietetic value. When softened by cooking they will be palatable.

C. When it is desirable to retain the shape of fruit in cooking it should be added to a hot sirup or sugar added at the beginning. If it is to be cooked into a sauce, it is cooked in hot water until soft and sweetening added last.

5. Methods of serving fresh fruit.—As a general rule, the fruit should be thoroughly cleansed, well chilled, and served attractively in such form that it can be eaten with little additional preparation. For most fruits the simplest ways of serving are the best.

6. Points to be considered in buying fruit:

A. Use fruits in season; not only are they cheaper but better in quality at that time. By following the market quotations for the fruits shipped in, it is frequently possible to tell when is the best time to buy. The fair-price list should show this. When the market is glutted with some fruits, as bananas and pineapples, they are sometimes sold directly from cars without the intervention of the middle man, and the price is considerably reduced.

B. Buy in quantity the fruits which may be held, if storage facilities permit. Buy citrous fruit by the box or half box. Apples may be bought in the fall and placed in storage, as the total cost is much less than the winter price of apples. Cooperative buying is an advantage, and a barrel of apples may be used by several families before danger of deterioration.

C. Buy from a producer whenever possible. Not only must the services of the middle man be paid for, but an extra charge must be made to insure against risk in spoilage. The grocer who handles fruit as a side line must expect more profit from this line than others on this account.

METHOD OF DEVELOPING LABORATORY WORK.

This lesson may include a comparison of fresh, dried, and canned fruit as to economy, ease of preparation, and palatability. Discuss the fresh fruits which are most economical (waste should be taken into consideration) at a different season of the year. Discuss the fruits most available in fresh condition at the time the lesson is given and suggest seasonable fruits which may be used at other

times, pointing out the cheapest and the most expensive kinds of fruits. Stress the value of the different fruits in the diet and the wisdom of including them even at a comparatively high price.

Suggest ways of serving fresh fruit.

(a) Alone.

(b) In combination.

(c) With other foods.

Prepare one or more fresh-fruit desserts.

In choosing the recipes to be demonstrated, those should be selected which will offer more unusual methods of preparing or serving fruits.

GRAPEFRUIT.

Cut in halves, crosswise. With a sharp knife cut the pulp away from the skin around the entire circumference; then separate the pulp from the skin, dividing the fruit into sections. Remove the core and skin in one piece. Serve the pulp in the skin with or without sugar or with a few tablespoons of grape juice poured over it. Garnish with a sprig of mint or a candied cherry.

WATERMELON.

Cut into slices; remove the pink portion from the rind and cut into small dice. Pour over it a small amount of grape juice, let stand 30 minutes and serve cold.

STUFFED PEARS.

Pare and core ripe pears. Fill the center with maple sugar and serve with cream.

BERRIES.

Wash ripe, firm berries. Drain well and chill. Serve on a plate arranged around a small mound of sugar.

PINEAPPLE.

Remove the crown, then cut into slices before paring. The paring may then be done with little difficulty and a minimum of waste. The eyes may be removed with a sharp knife or a pair of scissors. Serve in slices garnished with bits of marshmallow, or cut into small sections, and mix with equal parts of diced orange, canned or fresh pears, or bananas. A small amount of lemon juice sprinkled over the sliced bananas will prevent them from turning dark on standing.

BAKED PEACHES.

Select firm peaches, halve them without removing the peel, fill the center with syrup, and bake until tender. Whole peaches may be baked, the seed giving a pleasant flavor.

BANANAS WITH SAUSAGE.

Peel bananas, cut in two crosswise, and place in frying pan, alternating with sausage. Cook slowly on top of the stove or in the oven, basting occasionally until bananas are done and slightly brown.

Sliced apples may be cooked with sausage in the same manner, or they may be fried in bacon fat and served with bacon. To each medium-sized apple add a tablespoon of molasses, sugar, or sirup, to flavor and brown the apple.

SHORTCAKE.

Make a dough, using the proportion given for shortcake in the table of preparations for quick breads. (Unit VII, Lesson 1.) Roll to half an inch thickness, cut in small rounds, and bake. While hot, split and butter each piece and spread with a layer of crushed sweetened berries, peaches, or other fruit. Serve with plain or whipped cream.

APPLE SNOW.

Whites of 2 eggs beaten stiff.

Half cup apple sauce (sweetened to taste).

Fold the hot apple sauce into the egg whites, chill and serve.

FRUIT MOLD.

Minute tapioca, 6 level tablespoons.

Whipped cream, 1 cup.

Sugar, $\frac{1}{2}$ cup.

Milk, 2 cups.

Vanilla, 1 teaspoon.

Heat milk in a double boiler. Add sugar and stir in the tapioca. Cook for 30 minutes. Pour into a bowl to cool, then fold in the cream, whipped. Ornament with fresh fruit (cherries, berries, etc.), chill and serve.

LESSON 2. THE USE AND PREPARATION OF DRIED FRUITS.

AIM.

To show the comparatively high food value of dried fruit, palatable methods of preparation and their use in the diet.

POINTS TO BE BROUGHT OUT.

1. Dried fruits are concentrated foods; they contain all the food value of the fresh fruit. They are especially valuable as sources of *sugar* and *mineral matter*.

Composition of some common dried fruits.

[United States Department of Agriculture, Office of Experiment Stations, Bulletin 28.]

Description.	Water.	Protein.	Carbo- hydrates (largely sugar).	Mineral.	Calories per pound.
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	
Dates.....	15.4	2.1	78.4	1.3	1,615
Figs.....	18.8	4.3	74.2	2.4	1,475
Prunes.....	22.3	2.1	73.3	2.3	1,490
Raisins.....	14.6	2.6	76.1	3.4	1,605

2. Dried fruits are especially good for children because they have along with the sugar valuable mineral constituents which are absent

from refined sugar. The desire of children for candy and sweets might well be supplied by the use of more dried fruits.

3. Those of the dried fruits which are richest in sugar and which contain the smallest amounts of fibrous cellulose are edible raw. These are dates, figs, currants, and raisins. They should always be sterilized by pouring boiling water over them or by steaming before eating, unless they are put up in sterilized packages, in which case the above precaution is unnecessary. When the dried fruit is to be cooked we have as our aims the softening of the fiber present, and in some cases the addition of sugar for flavor. We accomplish this by:

A. Soaking to restore the water lost in drying.

B. Slow cooking in the water in which soaked until tender and juice concentrated.

C. Addition of smallest amount of sugar necessary to give the flavor desired without destroying the fruit flavor.

4. Uses of dried fruits:

A. As a substitute for fresh-fruit sauce.

B. As a confection or cake filling.

C. As a source of sugar and flavor in desserts.

METHOD OF DEVELOPING LABORATORY WORK.

Samples of all dried fruits available on the local market should be on hand with prices of each. If some are not available that should be, discuss the possibility of having them ordered by a local grocer. Suggest the home drying of fruits when they are available as a means of saving waste, and providing a valuable food for the winter. Samples of each fruit should be cooked according to method given in 3, and compared for flavor. Estimate the amount of sugar needed for those which are not sufficiently sweet. See that the flavor of the fruit is brought out and not masked by the sugar used. Show that sirup can be used instead of sugar in case of sugar shortage.

Demonstrate or have the students prepare fruit paste by grinding a mixture of dried fruits (equal parts of figs, dates, and raisins or any other dried fruits available). Nuts may or may not be added. They had better be omitted if this confection is to be eaten by children. Moisten the paste with a small amount of sirup, and shape into squares or balls. These may be rolled in crushed nuts or dipped into melted chocolate. This paste may also be used as a cake filling.

A dried-fruit dessert should be demonstrated, either one suggested below or a similar one. Have the students bring in recipes in which dried fruits are used and discuss possible modifications by substituting dried fruit for a portion or all of the sugar called for.

PRUNE WHIP.

Whites, 4 eggs.

Lemon juice, $\frac{1}{2}$ tablespoon.Sugar, $\frac{1}{2}$ cup.Prunes, $\frac{1}{4}$ pound.

Cook the prunes until soft. Rub through a sieve, making a thick pulp. Stir in the sugar and lemon juice. Beat the egg whites stiff, fold in the prune pulp, place in a buttered dish, and bake 20 minutes in a moderate oven.

APRICOT SOUFFLÉ.

3 eggs.

Apricot pulp, 1 cup.

Thick white sauce, $\frac{1}{2}$ cup.Salt, $\frac{1}{2}$ teaspoon.Sugar, $\frac{1}{4}$ cup.

Beat the egg yolks, add sauce, salt, sugar, and fruit pulp. Fold in the stiffly beaten whites and bake in a moderate oven.

PEACH PASTE.

Cook fruit until tender. Press through a sieve. Measure, and to each pound of pulp, allow 1 pound of powdered sugar. Cook together over a slow fire, watching carefully to prevent scorching, until it begins to thicken. Cooking the pulp in a double boiler for the last part of the process will prevent scorching. Pour $\frac{1}{2}$ -inch layers of the paste on the oiled surface of a flat dish or tray. Place in a current of air and allow to dry for two or three days. When it is dry, sprinkle with granulated sugar and form into a roll.

PARISIAN SWEETS.

Chop equal parts of figs, dates, and nuts together. Knead on a board dredged with confectioners' sugar until well blended. Roll to $\frac{1}{8}$ -inch thickness, cut into cubes or rounds, and dip each piece in confectioners' sugar. Store in tin boxes (A small amount of honey is an improvement.)



LESSON 3. WAYS OF PREPARING POTATOES.

AIM.

To show how to cook starchy vegetables so as to conserve their food value.

POINTS TO BE BROUGHT OUT.

1. Aim in cooking starchy vegetables is:

A. To render more digestible by softening the cellulose and cooking the starch grains.

B. To retain the mineral matter.

C. To improve the flavor.

2. Points to be considered in cooking:

A. Moist heat is necessary to soften the cellulose and cook the starch. This may be obtained by cooking in steam or liquid or by applying dry heat to the outside if the vegetable contains sufficient water to furnish the necessary moisture.

B. Much of the valuable mineral matter lies just beneath the skin, therefore the largest amount of this is retained when the vegetable is cooked in the skin.

C. If the vegetable is to be pared, the paring should be as thin as possible, so that the least amount of mineral is lost.

D. Since the mineral matter is soluble, the water in which pared or sliced vegetables are cooked contains much food value. It should either be served with the vegetables or used in soups, gravy, sauces, etc.

E. The flavor of the vegetable is both volatile and soluble, so may be retained by cooking with as little escape of steam as possible and by retaining the liquid in which the vegetable is cooked.

3. Methods of cooking:

A. Baking.—One of the most economical methods, but adapted chiefly to vegetables having an outside coat to hold in the steam and containing enough water to cook the starch and soften the cellulose.

B. Casserole cooking.—Similar to baking, the covered dish taking the place of the peel and retaining flavor and food value.

C. Boiling.—A good method when the peel is left on during the cooking, or when only a small amount of liquid is used and this retained for food.

D. Escaloping.—Suitable for the first cooking or for reheating left-over vegetables. The liquid is retained and the crumbs on top help to hold in the flavor and add additional flavor when browned.

E. Frying.—Suited to very few vegetables, except as a method of preparing left-over dishes. In this case it is used to add flavor. The intense heat tends to overcook the outside before the inside is done, except when the vegetable is sliced very thin.

F. Sautéing.—The temperature is somewhat higher than boiling. The fat used tends to soak into the vegetable and render it less digestible, but adds flavor by browning.

4. Seasoning and serving:

A. Vegetables are low in fat, hence the usual seasonings are some form of fat, added either in cooking or in serving; salt and pepper if desired.

B. Sauce may be added, either a white sauce made of milk or one made with the liquid in which the vegetable was cooked. This retains the mineral and gives a more individual flavor to the vegetable.

5. Special points to be kept in mind in cooking potatoes:

A. The distinctive flavor is developed by preventing loss by solution or volatilization, as in baking or cooking in skin. Dried boiled potatoes lose some food value and most of the distinctive flavor.

B. After tender any excess water should be removed and steam allowed to escape to prevent potatoes becoming soggy.

METHOD OF DEVELOPING LABORATORY WORK.

This lesson may be devoted entirely to the cooking of potatoes as a representative starchy vegetable. Have different students cook potatoes in the following ways: (1) Boiled in the skin; (2) pared and boiled whole; (3) sliced and boiled, discarding the water; (4) sliced and boiled, retaining the water. Mash, season similarly, and compare for flavor. Find out the average number of times a day potatoes are used in the homes of the students and stress in the lesson the desirability of correct methods in preparing a vegetable so frequently used and also the advantage of varying the methods of serving. Show how potatoes are similar in composition to bread and how the abundant use of them can help to save bread when cereals are scarce. Have women compare food value of baked potato and slice of bread, rice, grits, and hominy.

NOTE TO TEACHER.—Adapt recipes prepared to needs of class. First aim to get good mashed or baked potatoes. Suggest fancy methods of preparation after more simple methods have been learned.

BAKED POTATOES.

Wash carefully and place in a moderately hot oven. From 45 minutes to an hour is necessary for a medium-sized potato. Test by pressing between thumb and finger. When done prick with a fork to allow the steam to escape. If the potato is rubbed with a small amount of fat before baking the skin will be softer than otherwise.

POTATOES ON THE HALF SHELL.

Bake as directed above. When done remove the skin from the top and scrape out the potato, leaving a shell. Mash the potato with a small amount of cream and butter or substitute; season with salt and pepper. Fill the shells with the mixture and brown in the oven. Grated cheese may be sprinkled over the top if desired.

SWEET POTATO AND NUT CAKES.

Boil sweet potatoes until tender. Drain off the water, remove the skin from the potatoes, and mash them with a small amount of cream and a little sugar or maple sirup. They should be stiff enough to mold into small cakes. Brush the top of the cakes with butter or substitute. Sprinkle with chopped nuts and brown in the oven.

POTATOES WITH CHEESE AND GREEN PEPPER.

Sliced cooked potatoes, 2 cups.	Grated cheese, $\frac{1}{2}$ cup.
Thick white sauce, 1 cup.	Bread crumbs, $\frac{1}{2}$ cup.
1 chopped green pepper or canned pimiento.	

Add the cheese and the chopped pepper to the sauce, mix with the potatoes, put into a baking dish, cover with the bread crumbs, and brown in the oven.

POTATO HASH.

Cooked potato, 3 cups.	Pepper, $\frac{1}{4}$ teaspoon.
Chopped cooked meat or fish, 2 cups.	Fat, 3 tablespoons.
Salt, 1 teaspoon.	Boiling water, $\frac{1}{2}$ cup.

Melt the fat in a frying pan, add the potatoes and meat, mixed. Pour water over the top and cook slowly without stirring until the underside is browned. Fold as an omelet and serve hot.

CASSEROLE SWEET POTATOES AND APPLES.

Pare and slice the sweet potatoes and apples, using 1 medium-sized apple to 2 potatoes. Place in a baking dish, sprinkle with a little brown sugar or add a small amount of sirup, pour over a cup of hot water, and bake covered until tender. Remove the cover, dot the top with bits of butter or substitute, and brown.

CANDIED SWEET POTATOES.

Boil and cut in halves medium-sized sweet potatoes, lay evenly in braising pan, baste with sirup and butter warmed together, sprinkle lightly with brown sugar, put in hot oven until brown, and serve in the sirup.

POTATO AND BEAN CAKES.

Boiled mashed potatoes, 1 cup.	1 small can pimentoes.
Cooked mashed lima beans, 1 cup.	Bread crumbs, $\frac{1}{2}$ cup.

Mix, season with salt and pepper, and form into cakes. Sauté in a small amount of hot fat or dip in egg and crumbs and brown in the oven. Serve with tomato or cheese sauce.

ESCALLOPED POTATOES.

Four medium-sized potatoes. Wash, pare, and slice very thinly until the bottom of the baking dish is covered. Over this layer sprinkle salt, pepper, dots of butter, and $\frac{1}{2}$ tablespoon of flour. Add another layer of potatoes and proceed as before. When all the potatoes are used, sprinkle buttered crumbs over the top and add milk to nearly cover potatoes. Bake until tender. This amount will require about one hour for baking.

WAYS OF USING LEFT OVERS.

Left-over boiled or baked potatoes may be prepared as hashed-brown potatoes, in salad, or warmed in milk.

Left-over mashed potatoes can be used in making biscuit or to make potato cakes.

LESSON 4. WAYS OF PREPARING GREEN VEGETABLES.

AIM.

To teach the principles underlying the cooking of green vegetables as they affect flavor and food values.

POINTS TO BE BROUGHT OUT.

1. Points in preparation:

A. Most green vegetables lose their flavor rapidly after being gathered, therefore should be cooked as soon as possible after gathering. This is especially true of corn, beans, peas, and asparagus. Keeping in a cool place will help to prevent the change in flavor. When these vegetables must be held after gathering they can be cooked and then reheated at the time of serving. The French housewife blanches all her vegetables when they come from the market. This wastes much of the mineral matter.

B. Wilted vegetables should be freshened by standing in cold water before being cooked.

C. Some parts of vegetables often discarded can be well used for food.

(1) Outer leaves of lettuce, spinach, or cabbage, or the tops of spring onions may be cooked and used for soups.

(2) Beet, turnip, or radish tops may be cooked and served as greens. Celery tops are good for flavoring.

(3) Stalks of cabbage or chard or the outside leaf stalks of cauliflower should not be discarded; when cooked tender they are desirable for the bulk they add to the diet, and may be used to furnish flavor for soups, salads, etc.

2. Points in cooking:

A. Tender green vegetables containing no starch and little cellulose require no cooking. They are frequently used as salad. (See Unit V, Lesson 5.)

B. Green vegetables containing a larger amount of cellulose or some starch may be rendered more palatable and in some cases more digestible by cooking in moist heat. Some vegetables, such as tender greens, or tomatoes, require no added water to cook them.

C. Food value is preserved in cooking by (a) steaming or (b) cooking in a small amount of water, which is retained, so that there is no waste of mineral matter.

D. Part of the flavor is volatile and passes off in the steam. This fact affects the method of cooking different vegetables.

(1) Weak-flavored vegetables should be cooked in a small amount of water in a covered vessel, so that the flavor will be retained.

(2) Strongly flavored vegetables should be cooked in an uncovered vessel, so that a part of the flavor volatilizes during cooking.

(3) Vegetables with excessively strong flavors may be cooked uncovered, in a large amount of water, which is poured off.

It should be remembered that this wastes the mineral matter and should not be done unless the water so removed is used to flavor soups.

(4) Green vegetables retain their color better if cooked uncovered.

E. Overcooking of vegetables spoils the flavor and, in the case of some vegetables, the color. The time required for cooking varies with the kind, size, and age of the vegetables.

Average time required for cooking vegetables in water.

Asparagus.....	15 to 20 minutes.	Corn, green.....	10 to 15 minutes.
Beans, lima (green).....	3 to 1 hour.	Onions.....	20 to 30 minutes.
Beans, string.....	1 to 3 hours.	Parsnips.....	30 to 45 minutes.
Beets, young.....	3 to 1 hour.	Peas, green.....	20 to 30 minutes.
Beets, old.....	3 to 4 hours.	Potatoes.....	30 to 40 minutes.
Cabbage.....	20 to 30 minutes.	Spinach.....	15 to 30 minutes.
Carrots.....	30 to 60 minutes.	Squash.....	20 to 30 minutes.
Cauliflower.....	20 to 30 minutes.	Turnips.....	30 to 40 minutes.

3. Seasoning and serving:

A. Simple methods are usually to be preferred; cooked tender and served with salt, pepper, and a little butter or other fat. This method preserves the individual flavor of the vegetable.

B. Sauces may be used, but care should be taken not to mask the flavor of the vegetable and not to make the serving monotonous by using the same kind of sauce for all vegetables.

C. For many vegetables, especially those containing large amounts of cellulose, an acid flavor is an improvement. Lemon juice or vinegar may be added to a butter sauce and served with the vegetables.

4. Canned vegetables:

A. Availability.—The development of the canning industry has been very great during the last few years. Canned vegetables of all kinds are now available at all times of the year. Most of these have been blanched in canning, and as the result of this the amount of mineral matter present has been lowered. Canned vegetables should not be used at times of the year and at such places as fresh vegetables are available because they are inferior to fresh vegetables in flavor and food value and are rarely more economical. During the seasons and at places when fresh vegetables are not available canned vegetables offer a most valuable means of adding bulk and desirable mineral salts to the diet and of varying a diet which is otherwise very monotonous. In some communities the use of canned vegetables is restricted to certain kinds. A wider use of less well-known varieties should be encouraged.

B. Preparation:

(1) Retain the liquid; it is not harmful and contains some of the flavor and mineral matter. Concentrate and use in butter sauce or use in preparation of white sauce or cream soups.

(2) Heat of sterilization has made the vegetable tender. No further cooking is necessary, but to insure safety it should be boiled 5 minutes before serving.

5. Dried vegetables:

A. Availability.—New methods of dehydration are making it possible to preserve the more succulent vegetables in this way. They are becoming increasingly available. They contain all the food value of the fresh vegetable in a more concentrated form. On account of their concentrated form these are especially valuable where food must be transported long distances.

B. Preparation:

(1) Soak to regain water.

(2) Prepare as fresh vegetables.

METHOD OF DEVELOPING-LABORATORY WORK.

A weak-flavored vegetable, such as celery or asparagus, should be cooked by the two methods, covered and uncovered, and compared for flavor. A strongly flavored vegetable, such as onions or cabbage, should be cooked and compared in the same way. The three principal points to be stressed are conservation of food value and of flavor and proper time of cooking.

Have on hand some of the canned vegetables which the women should be encouraged to use. These can be furnished by the women of the class and carried home for use. Have these weighed and measured and calculate the price of the fresh vegetable below which the canned would be less economical. Have each of these prepared in some attractive way. If any dried vegetables are available, demonstrate their preparation. If suited to the group, a discussion of the vegetable garden might well be used here. (See Unit XII, Lesson 6.) For length of time for cooking in the following recipes, see table on page 43.

BAKED BEETS.

Select young, tender beets, wash well, put into a covered baking dish with a small amount of water and bake until tender. Serve with butter. Note how the method of cooking brings out the sweet flavor usually lost when cooked in a large amount of water.

CREAMED CABBAGE.

Cut cabbage into small pieces and cook uncovered in salted boiling water until tender. Drain off the water concentrate, if necessary, and use as the basis of white sauce. Place the cabbage in layers in a baking dish, alternating with sauce; cover with buttered crumbs and brown in the oven.

ASPARAGUS.

Wash asparagus. Tie in small bunches and stand on end in a deep pan, leaving the tips up. Add a small amount of water. Cover and cook until the

stems are tender. The tips will be cooked by the steam, but will not be over-cooked, as is the case when cooked in water. Season with butter or substitute. Serve on toast with white sauce made from the liquid in which the asparagus was cooked, or serve with Maitre d' hotel butter. (For recipe, see Unit VI, Lesson 6.)

LESSON 5. NEW AND PRACTICAL WAYS OF USING VEGETABLES.

AIM.

To show how to prepare vegetables more palatably so that they will be used to a greater extent in place of the more staple foods.

POINTS TO BE BROUGHT OUT.

1. Many people include too few vegetables in their diet, principally because—

A. They learn to depend upon a few well-known vegetables and are not acquainted with many varieties.

B. Vegetables are often poorly cooked and unattractively served, so that they are not appetizing.

C. Many families fail to can, dry, or store vegetables in the season of their abundance, which limits their consumption during the winter months when fresh vegetables are out of season and high in price.

2. A normal adult should have at least 1 to 1½ pounds of fruit or vegetables daily for the sake of health. (See Lesson 1.)

A. Starchy vegetables may sometimes be used to advantage in place of cereals.

(1) In place of a part of the usual amount of bread eaten.

(2) In place of pastry, in cooking (as potatoes in shepherd's pie).

(3) Combined with flour in baking (potato bread, sweet potato muffins).

B. Legumes, such as beans or peas, may be used in place of part of the meat. (See Unit III, Lesson 4.)

C. Fresh vegetables are perishable and not easily transported. When abundant they can be used to advantage, from the standpoint of both health and economy.

3. The housewife should encourage a more extensive use of vegetables by—

A. Serving a variety, including the more unusual kinds, and seeing that the family learns to like all kinds.

B. Taking care in the preparation to make them appetizing and frequently varying the method of serving.

4. Canned and dried vegetables may be used to furnish variety. Canned vegetables frequently require careful seasoning; dried vegetables should be soaked in water for several hours, then cooked as fresh vegetables.

METHOD OF DEVELOPING LABORATORY WORK.

The teacher should ascertain what vegetables are in common use in the community and the usual method of preparing these. This lesson will offer an opportunity to introduce new varieties and to try new methods of preparation. The general rules for cooking vegetables given in Lessons 2 and 3 should be used in cooking, and especial care should be taken to have the dishes appetizing.

VEGETABLE SOUPS.

2 turnips.	6 tomatoes (or 1 pint).
2 potatoes.	Rice, 2 tablespoons.
1 onion.	Chopped parsley, 2 tablespoons.
6 stalks celery with tips.	Butter or savory fat, 2 tablespoons.
2 carrots.	Salt.
1 quart water.	Pepper.

Chop the vegetables or put them through the meat grinder. Combine all the ingredients and cook until the rice is tender.

Any combination of fresh vegetables or left-over vegetables may be used.



VEGETABLE CHOWDER.

4 potatoes.	Fat, 2 tablespoons, or a small piece
3 carrots.	of salt pork.
3 onions.	Flour, 3 tablespoons.
1 pint tomatoes.	Skim milk, 2 cups.
Salt, 2 teaspoons.	

Cut the potatoes and carrots into small pieces, add water to cover, and cook 20 minutes. Brown the chopped onion in the fat, add the flour and the tomatoes, and when thickened, add to the vegetables. Heat the milk and combine with the vegetables just before serving.

SPINACH LOAF.

Chopped spinach, 1 can.	Thick white sauce, 2 cups,
Boiled rice, 4 cups,	1 red pepper, chopped.

Mix, form into a loaf, and bake 20 minutes.

VEGETABLE SOUFFLÉ

Thick white sauce, $\frac{3}{4}$ cup,	Chopped, cooked vegetable, or vegetable pulp (green or dried beans, peas, asparagus, green corn), 1 cup.
3 eggs,	Salt, pepper.

Beat the egg yolks; add white sauce, seasoning, and vegetables; fold in the beaten egg whites; put into a buttered baking dish and bake in a moderate oven until firm.

LESSON 6. THE VEGETABLE DINNER.

AIM.

To plan a dinner, making the greatest possible use of vegetables.

POINTS TO BE BROUGHT OUT.

1. By judicious choice of vegetables and proper combinations with other foods it is possible to plan a well-balanced dinner composed almost entirely of vegetables. The old-fashioned "New England" boiled dinner is an example of a meal of this type.

2. In selecting vegetables for a meal care should be taken to include vegetables of different composition, and a starchy vegetable, one high in protein, and succulent vegetables should be represented.

3. A greater variety of vegetables is usable than when the usual type of meal, including meat, is planned.

4. Desirable additions to such a meal are fats or fat meat, which increase the fuel value and satisfying character of the meal; or cheese and milk, which furnish protein of a very desirable type.

METHOD OF DEVELOPING LABORATORY WORK.

Have typical meals prepared. Have women plan, prepare, and serve similar meals at home, reporting upon their cost and desirability. Suggested menus:

1.	2.
String beans with fat meat.	Fresh young onions.
Boiled or steamed potatoes.	Turnip greens with hog jowl.
Steamed beets with butter.	Corn bread and butter.
Corn on cob.	Butter beans.
Fresh apple pie.	Baked custard with fruit.

Other desirable combinations will be suggested by the women.

REFERENCES.

United States Department of Agriculture:

Farmers' Bulletin 293. Use of Fruit as Food.

Farmers' Bulletin 871. Fresh Fruits and Vegetables as Conservers of Other Staple Foods.

Farmers' Bulletin 256. Preparation of Vegetables for the Table.

Department Bulletin 123. Extension Course in Vegetable Foods for Self-Instructed Classes in Movable Schools of Agriculture.

States Relations Service, Bulletin 392. Lessons on Tomatoes for Rural Schools.

States Relations Service, Bulletin 468. Potatoes, Sweet Potatoes, and Other Starchy Roots as Food.

States Relations Service, Bulletin 503. Turnips, Beets, and Other Succulent Roots, and Their Use as Food.

U. S. Department of Agriculture (in cooperation with Women's Committee, Council National Defense) :

The Day's Food in Peace and War.

U. S. Food Leaflet No. 16. Fresh Vegetables.

U. S. Food Leaflet No. 9. Vegetables for Winter.

U. S. Food Leaflet No. 10. Plenty of Potatoes.

NOTE.—The United States food leaflets and bulletins issued by the Food Administration are no longer published, but where a supply previously obtained is still available they will be valuable as references.

UNIT III.

Practical Ways of Using Peas, Beans, and Nuts.

GENERAL INFORMATION.

The dried legumes and nuts are considered in a separate unit because their composition is such as to make their function in the diet and their method of preparation differ from the other vegetable foods. They are concentrated foods, rich in protein and in some cases fat, so are valuable in supplementing the more bulky forms of vegetable foods. The peanut is botanically a legume, though its characteristics are more like those of the nuts.

LESSON I. THE USE AND PREPARATION OF DRIED PEAS AND BEANS.

AIM.

To teach the use and methods of preparation of dried peas and beans.

POINTS TO BE BROUGHT OUT.

1. Food value:

A. Rich in *protein* material.

(1) Amount—

- 1 pound lean meat furnishes 3 ounces protein.
- 1 pound navy beans furnishes $3\frac{1}{2}$ ounces protein.
- 1 pound soy beans furnishes 5-6 ounces protein.
- 1 pound cowpeas furnishes $3\frac{1}{2}$ ounces protein.

(2) The protein in soy beans may well be used in place of that in meat. The protein of the navy bean and dried pea is less efficient, and should not be used as the sole source of protein food.

B. Energy-yielding material:

(1) *Starch* is abundant in navy, lima, and pinto beans, but it is low in soy beans.

(2) *Fat* is especially rich in the soy bean. It is low in the other beans and peas. That accounts for the usual combination

of "pork and beans." At 15 cents a pound beans furnish nearly three times as much energy (total calories) as 1 pound of round steak at 35 cents a pound or 1 pound of veal at 33 cents.

C. *Mineral matter* is abundant in all legumes and should be conserved in cooking. Legumes are especially valuable as sources of iron.

D. *Vitamines*.—These foods are sources of one of the essential dietary substances known as "water soluble B." (See Unit XII, Lesson 3.) This seems to be destroyed if they are cooked with the addition of soda. In a well-balanced dietary this loss need not be considered, but in a limited diet, soda should not be used.

2. Methods of cooking:

A. In order that these foods may be well digested they must be cooked until they are very soft. This may best be done by—

(1) Soaking several hours (overnight, if for soy beans), to replace the water lost in drying.

(2) Cooking slowly and for a long time. (A fireless cooker is desirable for this purpose.)

(3) Using soft water in which to cook. The use of hard water tends to harden the beans or peas.

(4) Soda may be used to soften the water if soft water is not available. To one quart of beans use one-fourth to one-third teaspoon soda. (See 1 D as to the desirability of using soda in cooking.) An equally efficient and probably less harmful method of preparation is to soak the beans overnight in the soda water. In the morning discard the soda water and cook in clear water. This decreases the length of time required, and consequently the amount of fuel necessary.

(5) The digestibility is increased by removing skins. This may be done by rubbing the cooked beans or peas through a sieve and using the pulp.

B. These foods are low in flavor, hence they are more appetizing when seasoned well or combined with highly-flavored foods. Pork fat, cheese, onion, green peppers, celery, or tomato combine well as seasonings.

C. Broken peas or beans may be used as well as whole ones. They are cheaper and just as nutritious.

METHOD OF DEVELOPING LABORATORY WORK.

Have on hand samples of all the varieties of dried peas and beans available, also prices of each. Plan to have some of each cooked to tenderness, either in class or prepared by the women and brought to class. Have accurate account kept of (a) kind of water used;

(b) amount of soda, if any; (c) method of cooking (over fire, fireless cooker, pressure cooker); and (d) length of time required for tenderness.

These beans should then be prepared for serving in some of the ways given. In case the original cooking must be done during the class period, some may be prepared for serving during the soup lesson which follows this lesson.

BOSTON BAKED BEANS.

1 quart beans (navy beans or two-thirds soy beans and one-third navy beans).	Salt, 1 teaspoon.
Sorghum, $\frac{1}{2}$ cup.	1 small onion.
Mustard, $\frac{1}{4}$ teaspoon.	Salt pork, $\frac{1}{4}$ pound, or vegetable oil, $\frac{1}{4}$ cup.

Soak beans overnight in cold water. Drain, cover with fresh water, and cook at a temperature just below the boiling point until skins will burst open when blown upon. Put the ingredients into a bean pot or casserole, cover with water, and bake slowly six to eight hours. Add water as needed.

MOCK SAUSAGE.

Dried lima beans, $\frac{1}{2}$ cup.	Fat, $\frac{2}{3}$ tablespoon.
Bread crumbs, 5 tablespoons.	Salt, $\frac{1}{2}$ teaspoon.
1 egg.	Pepper.
Chopped parsley or sage, $\frac{1}{2}$ teaspoon.	

Cook the beans and rub through a sieve. Add bread crumbs, egg, fat, and seasoning. Shape into sausages, roll in cornmeal or egg and crumbs, and brown in the oven or cook in hot fat.

SOY BEAN SALAD.

To one cup cooked soy beans, add one small onion, chopped, two small sour pickles, paprika, and one-fourth cup chopped celery or cabbage. Serve with a boiled dressing.

SPLIT PEA LOAF.

Cooked peas, 2 cups.	Paprika, $\frac{1}{2}$ teaspoon.
Pimento, $\frac{1}{4}$ cup; cut into small pieces.	Bread crumbs, $1\frac{1}{2}$ cups.
Salt, 1 teaspoon.	Canned tomatoes, $\frac{1}{2}$ cup.

Press the peas through a colander, mix with the other ingredients, mold into a loaf, and bake 30 minutes.

BAKED SOY BEANS.

Yellow soy beans, $1\frac{1}{2}$ cups.	Mustard, $\frac{1}{4}$ teaspoon.
White beans, $\frac{1}{2}$ cup.	Salt pork, $\frac{1}{4}$ pound.
Sugar, $\frac{1}{2}$ cup.	1 small onion.

Soak beans 12 hours; put into baking dish in which the salt pork, onion, sugar, and mustard have been placed. Cover with cold water, and cook in a slow oven at least 12 hours. Add water as needed.

BOILED COWPEAS WITH BACON.

The desired quantity of peas to be cooked should be washed in cold water. Put in iron pot or stewpan, cover with cold water, drop in a piece of fat bacon, boil slowly until tender, season with pepper and salt, simmer slowly until ready to serve. A small piece of butter will add greatly to their flavor.

BAKED COWPEAS.

Prepare as for boiling; when half done pour into the baking pan; season with butter, pepper, and to every pint of peas add 1 scant teaspoonful of salt and a pinch of sugar; scar a piece of bacon and half bury it in the middle of the dish; cook slowly until done to a delicate brown; serve either hot or cold.

LESSON 2. SOME GOOD SOUPS FROM PEAS AND BEANS.

AIM.

To teach methods of preparation of cheap and nutritious soups.

POINTS TO BE BROUGHT OUT.

1. Food value.—The legumes form the basis of nutritious and palatable soups which are similar in their method of preparation to cream soups. In them the fat which is lacking may be added, and if milk is used in their preparation the incomplete legume protein is supplemented. The lacking carbohydrate is supplied by the bread eaten with the soup. (See Unit III, Lesson 1.)

2. Use in the diet:

A. As a main dish at luncheon—Prepare with milk and make thick.

B. As first course in a meal low in protein they supplement the protein especially if made with milk.

C. Avoid as first course in a meal which is protein rich.

3. Method of preparation:

A. Rub the well-cooked legumes through the strainer so as to remove the skins. This makes a smoother soup and increases the digestibility. Use one-fourth cup pulp to one cup water in which beans were cooked (provided no soda was used), one cup of skim milk, or a mixture of the two.

B. For each cup of liquid use one tablespoon of butter. Melt the butter and add small portion of onion. Cook until brown. Add to the melted butter one teaspoonful of flour for each cup of liquid. This is necessary in order to bind the soup and prevent the bean pulp from settling out. Add butter and flour mixture to the liquid and pulp. Let come to a boil. This may be made thicker or thinner as desired by increasing or decreasing the amount of liquid used.

In case of soy beans the amount of flour should be increased, since the soy bean contains so small a portion of starch.

METHOD OF DEVELOPING LABORATORY WORK.

Have soups prepared from the various legumes used in the previous lesson. Calculate the cost. Emphasize as a method of utilizing skim milk.

SOY BEAN SOUP I.

Soy beans, 1 pint.	Salt, 1 teaspoon.
Cold water, 2 quarts.	Mustard, $\frac{1}{4}$ teaspoon.
1 small onion.	Butter, 2 tablespoons.
2 small stalks celery.	Flour, 2 tablespoons.
1 lemon.	Pepper, $\frac{1}{3}$ teaspoon.
2 hard-boiled eggs.	

Soak beans overnight; in the morning, drain, add celery and cold water; cook four hours or until tender. Cut onion in thin slices and brown slightly in the butter; add flour, seasoning, and beans, water and pulp. Reheat to boiling point, strain, and pour over the egg and lemon, which have been cut into slices.

SOY BEAN SOUP II.

Soy beans, 1 cup.	Milk, 1 quart.
Butter, 2 tablespoons.	Salt, 1 teaspoon.
Flour, 2 tablespoons.	Pepper, $\frac{1}{3}$ teaspoon.

Soak beans 12 hours; drain and cook in water four hours or until tender; then rub through sieve. Brown the chopped onion in the butter; add flour, milk, and bean pulp; boil one minute, stirring constantly; season and serve.

GREEN-PEA SOUP.

Green peas, 2 quarts.	Butter, melted, 2 tablespoons.
Water, 4 quarts.	Flour, 1 teaspoon.
1 onion, chopped fine.	Salt.
1 sprig mint.	Pepper.
1 sprig parsley.	

Boil the peas in water for two hours, renewing liquid by adding boiling water as needed. Strain, return the liquor to the pot. Rub the peas through a sieve; mix the pulp with the onion, mint, and parsley. Add to the liquor in the pot and let boil 15 minutes. Stir the flour into the butter, mix well, and stir into the boiling soup; add salt and pepper to taste; serve with well-buttered strips of toasted bread.

PEA SOUP I.

Hulled peas, 1 quart.	White sauce.
Water, 4 quarts.	Salt and pepper.

Boil the peas in the water until perfectly soft. Mash the peas; add the white sauce and seasonings, stirring and boiling as for green-pea soup.

PEA SOUP II.

Peas, 1 quart.
Water, 4 quarts.
Bacon, 2 ounces.

6 onions.
Salt.
Pepper.

Put the bacon and onions, chopped fine, into a saucepan; salt and pepper to taste; add the water; boil 20 minutes. Meantime rub through a sieve a quart of peas that have been previously boiled; add them to the first ingredients; boil one hour longer and serve hot.

LESSON 3. NUTS AND THEIR USES.

AIM.

To emphasize the food value of nuts and their place in the diet.
To teach methods of preparation of nuts.

POINTS TO BE BROUGHT OUT.

1. Food value.—Nuts are very concentrated foods, being especially rich in *protein* and *fat*, so are valuable both as sources of energy and building material. On account of their concentrated form they are especially valuable to supplement the less concentrated foods like fruits and vegetables. All nuts except chestnuts are low in *carbohydrates*.

Composition of edible portions of some of the more important nuts.

[Adapted from "Food Products," by Sherman.]

Description.	Water.	Protein.	Fat.	Carbo- hydrate.	Ash.	Calories per pound.
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	
Almond.....	4.8	21	54.9	17.3	2.0	2,940
Chestnut.....	5.9	10.7	7	74.2	2.2	1,828
Coconut.....	14.1	5.7	50.6	27.9	1.7	2,675
Hickory nut.....	3.7	15.4	67.4	11.4	2.1	3,238
Peanut.....	9.2	25.8	38.6	24.4	2.0	2,490
Pecan.....	2.7	9.6	70.5	15.3	1.9	3,330
Walnut.....	2.5	16.6	63.4	16.1	1.4	3,182

2. Digestibility.—Contrary to the usual idea, nuts are easily and fairly completely digested if well masticated and eaten at the proper time, as a constituent portion of the meal and not after or between complete meals, when they are added to an already adequate diet.

3. Methods of cooking.—Most nuts are edible raw; the chestnut is the only one which contains enough starch to make cooking important from the standpoint of digestibility. The almond and peanut are more palatable after heating, due to changes in flavor and changes in the carbohydrates. Combination nut dishes are cooked on account of any other constituents which may need cooking, to develop flavor and because of the psychological value of the hot dish.

4. The place and use in the diet.—Nuts should be used as an integral part of the meal, not as a condiment or food adjunct. Their concentrated character makes them especially liable to misuse. They should be used with more bulky foods.

A. On account of their high protein value nuts are frequently used as the main dish of the meal. In imitation of meat dishes they are made into loaves, croquettes, cutlets, etc.

B. When the salad is the principal dish its food value may be increased by the use of nuts.

C. Nuts are added to confections and cakes as a source of fat and flavor. From this point of view it is interesting to note the amount of fat some of the more usual forms of nuts contain and the measure of butter to which their fat content is equivalent.¹

Description.	Weight (1 cup).	Fat.	Weight fat in 1 cup nuts.	Measure of butter to which equivalent.
	<i>Grams.</i>	<i>Per cent.</i>	<i>Grams.</i>	<i>Cup.</i>
Pecan.....	122	71	86	0.4
Peanuts.....	180	38	68	.3
Hickory.....	120	67	80	.4
Almond.....	154	55	69	.35
Coconut (shredded).....	106	50	55	.3

5. Comparative economy.—All the nuts are concentrated sources of energy, and the peanut and almond are high in protein. They vary greatly in price according to locality and time of year. Peanuts are the cheapest and are usually very economical sources of both energy and protein. In some localities black walnuts, hickory nuts, and chestnuts may be had for the gathering. Pecans are becoming more abundant. In this lesson the use of locally available nuts should be emphasized.

METHOD OF DEVELOPING LABORATORY WORK.

Have typical nut dishes prepared. Compare cost per service with similar dishes prepared from the legumes and from meat. Have nut dishes used at home and reported upon. In the following recipes nuts other than those given may be substituted. Suggest other recipes which are particularly adapted to local conditions.

PEANUT LOAF.

Ground peanuts, 1 cup.	1 egg.
Bread crumbs, 1 cup.	Chopped onion, 2 tablespoons.
Boiled rice, 2 cups.	Salt.
Tomatoes, $\frac{1}{2}$ cup.	Pepper.

Mix, mold into a loaf, and bake 30 minutes.

¹ Unpublished material, Department of Home Economics, University of Missouri.

MOCK VEAL CUTLETS.

Lentils, 1 cup.	Grated celery, 1 tablespoon.
Butter, $\frac{1}{4}$ cup.	Minced onion, 1 tablespoon.
Graham-bread crumbs, fine, 1 cup.	Mixed herbs, $\frac{1}{4}$ teaspoon.
Strained tomatoes, 1 cup.	Salt, $\frac{1}{4}$ teaspoon.
Peanuts, blanched and chopped, 1 cup.	Pepper.

Wash the lentils and soak overnight; in the morning strain and parboil for 30 minutes in fresh boiling water. Drain and cook until soft in sufficient boiling water to cover them. Rub through a sieve and to the mixture add the butter, bread crumbs, tomatoes, to which a speck of soda has been added, and all the other ingredients. Blend all thoroughly and form into cutlets. Dip these in egg and then in fine bread crumbs; place in a well-greased baking pan and brown in quick oven. Arrange around a mound of mashed potato and serve with brown sauce.

BROWN SAUCE.

Peanut butter, 1 teaspoon.	Cream, 1 tablespoon.
Browned flour, 2 tablespoons.	Milk, 2 cups.
Tomatoes, 4 tablespoons.	Salt and pepper.

Mix the peanut butter and flour with the cream; heat the milk and add it gradually; stir and cook until the mixture thickens. Just before serving add the tomatoes, salt, and pepper.

LESSON 4. THE MEATLESS MEAL.

AIM.

To bring out the point that meat is not an essential of the meal and show how meals may be built around legumes and nuts as the principal source of protein.

POINTS TO BE BROUGHT OUT.

1. These dishes are concentrated and high in protein and should be combined with more bulky foods rich in carbohydrates.
2. These dishes are especially valuable sources of protein when milk is used in their preparation to supplement the incomplete proteins.

METHOD OF DEVELOPING LABORATORY WORK.

This lesson should serve as a review of the preceding lessons of the unit. Have the women plan and serve a meal built around the dishes prepared. Have variety in the type of meals prepared,

varying from a simple home luncheon to a company vegetarian dinner. The teacher should see that these menus are sufficiently high in calories and should be ready to offer suggestions as to desirable combinations.

SUGGESTED MENUS.

I.

Baked beans.
Brown bread.
Pickles.
Baked apple.

II.

Nut loaf or croquettes.
Potatoes.
Green vegetables.
Salad.
Dessert.

III.

Soy-bean soup.
Salad.
Dessert.

IV.

Boiled beans with pork.
Green vegetables.
Corn bread and butter.
Dessert.

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UNIT IV.

Milk, Cheese, and Eggs.

GENERAL INFORMATION.

1. Milk is one of the essential foods because it is the best building food for children. No other food can take its place for this purpose. Its perishable nature and the difficulties attending its production, transportation, and marketing make it a product peculiarly sensitive to disturbed conditions, so that both the quantity and the price are liable to be seriously affected.

2. Dairy situation in Europe:

A. There has been a marked decrease in the dairy herds and a further decrease in the milk production. The decrease in the number of dairy animals is due to—

(1) Seizure of many animals by the enemy during the period of invasion.

(2) Slaughter of animals for food, to help in the serious meat shortage.

B. The remaining dairy animals have been producing but 50 per cent of the normal amount of milk, due to—

(1) Inability to import feed grains.

(2) Diversion of grain within the countries for human food.

(3) Inefficient and untrained labor.

3. Increase in price:

A. Even before the war there was an upward trend in the selling price of milk in the United States. The factors causing this increase, which have become even more important since 1914, are—

(1) Increased wages for labor.

(2) Increased cost of feed.

(3) Increased cost of dairy equipment.

(4) Increased cost of transportation.

B. Fair price necessary to insure production.—To pay the price that assures a reasonable profit to the producer and thus maintain production is self-protection on the part of the consumer. If the price of milk is lowered below the level of fair returns, the farmers would reduce their herds, and the resulting milk shortage would greatly increase the selling price. It is unfortunate that an increase in price curtails the use, especially among the poor, where without it the children are more liable to have an insufficient diet.

4. The United States must maintain its dairy herds:

A. To supply our own needs and maintain the health, particularly of the children, of the country.

B. To furnish exports of dairy products in the form of butter, cheese, and condensed or dried milk sufficient to meet the needs, as far as possible, of the European countries. This calls for greatly increased shipments during the reconstruction period as isolated countries are opened up and larger facilities become available.

C. To help in the restocking of the depleted herds of Europe.

5. Wise use of dairy products means:

A. Using enough milk for health, for adults, and giving children plenty of whole milk to insure normal growth and health, but letting none be wasted.

B. Using butter on the table, but substituting other fats in cooking.

C. Using cheese more abundantly.

LESSON 1. MILK AND ITS VALUE IN THE DIET.

AIM.

To teach the composition and the food value of milk and the effect on milk of acids and of the enzyme, rennin.

POINTS TO BE BROUGHT OUT.

1. Composition and food value of milk:

Constituent.	Limits of variation.	Convenient approximation of average.
	<i>Per cent.</i>	<i>Per cent.</i>
Fat.....	3.0- 6.0	4.0
Protein.....	3.0- 4.0	3.3
Milk sugar.....	4.6- 5.0	5.0
Mineral matter.....	.7- .73	.7
Water.....	84.0-87.0	87.0

The composition varies with the breed of the cow, the period of lactation, the season of the year, and the completeness of milking. The cow must have a sufficient amount of food, but the food in itself has little influence on the composition of the milk. The fat is the most variable constituent. Jersey cows usually give milk containing 5 per cent or more fat, while the milk from Holsteins may not have more than 3.5 per cent.

Special points about the composition of milk:

A. Milk should be considered as a real food, not simply as a beverage. Although milk contains about 87 per cent *water*, it contains more solid matter than most vegetables.

B. The *protein* of milk is chiefly casein and lactalbumin, two of the very best kinds for promoting growth. It is one of the protein foods containing none of the substances which yield uric acid in the body, nor is it readily susceptible to intestinal putrefaction.

C. The *fat* is in an emulsified form and is easily digested. It contains a substance essential for growth and the maintenance of health which has been called "fat soluble A."

D. The *sugar* in milk is lactose, less sweet than cane or beet sugar.

E. Milk furnishes both *calcium* and *phosphorus* necessary for body construction. It is one of the best sources of *calcium*, a given quantity containing more than an equal quantity of lime water. The *phosphorus* is abundant and in a readily available form. Milk is low in *iron*, but what is present is in an available form. This may be supplied from eggs, fruit, or green vegetables.

F. Milk is called a "protective food." It contains, in addition to other important food principles, the two unidentified "dietary essentials" which are necessary for growth and the maintenance of health.

G. Milk is lacking in laxative properties. The diet should be supplemented by laxative foods, such as fruits, vegetables, and whole cereals.

2. Importance and value.—Because it contains all the nutrients in an easily assimilable form it is one of the most valuable foods. For children nothing else can take its place. Small children should have a quart a day, is possible, or a pint without fail. Skim milk is valuable because it contains all the protein and mineral matter, but it can not entirely take the place of whole milk because of the absence of the fat and the necessary fat soluble food accessory.

3. Comparison with other protein foods.—Milk is one of the cheapest sources of animal protein.

Amount and cost of typical foods containing 1 ounce of protein.

Kind.	Amount.	Cost.	Calories.
Skim milk.....	1 quart, at \$0.05.....	\$0.05	352
American cheese.....	4 ounces, at 40 cents per pound.....	.10	400
Cottage cheese.....	5 ounces, at 15 cents per pound.....	.05	166
Whole milk.....	1 quart, at 15 cents.....	.15	620
Eggs.....	6, at 50 cents per dozen.....	.25	300
Beef—round, medium fat.....	6 ounces, at 30 cents per pound.....	.11	250

4. Care of milk:

A. Milk is a food which is easily contaminated and which may be the medium by which germs of typhoid and some other diseases are

carried. Unless it is known that milk comes from healthy cows kept under sanitary conditions, and that it has been handled in a sanitary way, it is safer to boil or pasteurize it.

(1) Certified milk means that the milk is certified as to its quality and wholesomeness by a properly constituted medical milk commission.

(2) Pasteurized milk has been heated to a temperature of 60° to 63° C. (140° to 145° F.) and held at this temperature 20 to 30 minutes. Milk should be pasteurized in the bottle or container to avoid any contamination in transferring.

(3) Sterilized milk is milk which has been brought to the boiling point. The temperature brings about slight changes in the milk which do not take place in pasteurization. Both sterilization and pasteurization will destroy disease germs and also the organisms which cause souring, thus making it possible for milk to be kept sweet for a longer time than under ordinary circumstances.

5. Ways to use milk as a food:

A. Whole milk—

(1) As a liquid food, either as fresh milk, buttermilk, or other fermented milks.

(2) In cookery.

(3) In cheese.

(4) In frozen dishes.

B. Skim milk—

(1) In cookery may be substituted for whole milk.

(2) In cheese (especially cottage cheese).

(3) As a beverage in the form of fermented milk.

C. Fat of milk—

(1) As cream.

(2) As butter.

6. Commercial forms of milk:

A. Evaporated or condensed milk is prepared by the removal of water with or without the addition of sugar. The following kinds are on the market:

(1) Unsweetened whole milk, condensed, ordinarily called evaporated milk.

(2) Sweetened whole milk condensed.

(3) Sweetened skim milk condensed.

B. Dried milk or milk powder.—Most of the water is removed and the solids reduced to a powder.

7. Effect of the enzyme, rennin, upon milk.—In the process of digestion when milk comes in contact with the enzyme, rennin, which is found in the stomach, the casein of the milk coagulates or clots. Most of the fat is entangled with the clotting casein. The

which contains the sugar, the lactalbumin, and a part of the mineral matter. The same result is obtained in making rennet custard with rennet or junket tablets. The points to be considered in making rennet custard or junket are:

A. Since the action of the junket tablet is due to the presence of an enzyme, the clotting takes place best if the mixture is at body temperature.

B. If the milk has been boiled, some of the lime salts are precipitated, and the milk will not clot, unless a calcium salt is added, since the presence of soluble lime salts is necessary for this. If boiling is necessary, as in adding chocolate, a small amount of milk may be heated with the chocolate and the remainder added, uncooked.

C. If the mixture is shaken or stirred after it begins to clot, there is a separation of the clot, which is undesirable. For this reason, any flavoring or sugar should be added to the milk before the junket tablet.

8. The effect of acid upon milk:

A. When a small amount of acid is added to milk it causes the casein to precipitate, or, as usually stated, the milk curdles. This frequently happens in cooking, one of the best examples being in the making of cream of tomato soup. This may be prevented by—

(1) Neutralizing the acid of the milk with soda. While this method is effective it spoils the good flavor of the soup, and since the acid of the tomato varies it is difficult to know how much soda to use.

(2) If the milk is slightly thickened and the tomato juice added to the thickened mixture with both at a little above serving temperature there is either no curdling or the curd formed will be held in suspension. Do not heat again after combining.

9. Method of preventing scum on heated milk:

A. A scum forms on milk or milk mixtures when they are heated, probably due to the drying out of the proteins on the surface of the heated milk. This can be in part prevented by any one of the following methods:

(1) Cooking and cooling in a covered vessel.

(2) Stirring to keep the mixture agitated.

(3) Beating with a Dover beater to form a protective foam over the top.

METHOD OF DEVELOPING LABORATORY WORK.

In connection with this lesson a visit to a dairy might be arranged, to see something of the care and handling of milk. It might also be advisable to have the class investigate the sources of the local milk supply, to ascertain grade and the cleanliness of

the milk furnished. Study the State and city laws in regard to dairy and milk inspection and see whether or not they are enforced.

JUNKET.

Milk, 3 cups. Junket, 1 tablet.
 Sugar, $\frac{1}{4}$ cup. Cold water, 1 tablespoon.
 Vanilla, 1 teaspoon.

Heat milk and sugar (or sirup) to body temperature, 37.5° C. (98.6° F.), add the vanilla and the junket tablet, which has been crushed and dissolved in the cold water. Pour immediately into serving dishes and let stand in a warm room until firm; then chill. Season with nutmeg grated over the top and serve with berries, chopped nuts, or jelly.

CREAM OF TOMATO SOUP.

Milk, 2 cups. Fat, 2 tablespoons.
 Tomato juice, 1 cup. Onion juice, $\frac{1}{2}$ teaspoon.
 Flour, 3 tablespoons. Salt and pepper.

Melt fat, stir in the flour, and add milk and onion juice, and cook 10 to 15 minutes. Remove from the fire and add the tomato juice, which has been heated. Both should be just above serving temperature when combined, and the soup should be served immediately.

NOTE TO TEACHER.—In case the women are not taking the starch unit, insert here the lesson on white sauces, starch pudding, and cream soups.

LESSON 2. THE COOKING OF EGGS.

AIM.

To show composition of eggs and method of preparation.

POINTS TO BE BROUGHT OUT.

1. Composition and food value:

A. Eggs are a valuable food, containing a high proportion of nutrients in a form well suited to use in the body.

Average composition of eggs (Langworthy.)

Description.	Water.	Protein.	Fat.	Ash.	Calories per pound
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	
Whole egg, edible portion.....	73.7	13.4	10.5	1.0	672
White.....	86.2	12.3	.2	.6	231
Yolk.....	49.5	15.7	33.3	1.1	1,643

B. The *protein* is somewhat higher in the yolk than in the white. In form it is very similar to protein in milk.

C. The *fat* is nearly all found in the yolk, of which it forms a third. It is emulsified and in an easily digestible form.

D. *Mineral matter* is high, especially in the yolk, which contains relatively large amounts of calcium, phosphorus, and iron, all in forms which are readily available.

E. Egg has been classed with milk as a protective food, and the egg yolk ranks next to milk as a source of the "fat soluble A."

2. Comparative food value of milk and eggs:

A. Eggs are similar to milk in the high proportion of nutrients they contain and in their ready digestibility.

B. Eggs differ from milk in that they contain no carbohydrates, but their high percentage of fat supplies energy.

C. Eggs are valuable in supplementing the low iron content of milk. One egg contains nearly 30 times as much iron as one cup of milk.

D. When digested in the body, milk leaves an alkaline residue, while eggs leave an acid residue which must be neutralized by the body.

3. Comparative food value of eggs and meat:

A. Composition of eggs compared with meat—

[Adapted from United States Department of Agriculture, Office of Experiment Stations, Bulletin 28.]

Food (edible portion).	Water.	Protein.	Fat.	Ash.	Calories per pound.
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	
Eggs.....	73.7	13.4	10.5	1.0	720
Beef steak—round, lean.....	70.0	21.3	7.9	1.1	730

B. Eggs supply the same nutrients as meat in a very similar proportion. Both are tissue-building and tissue repairing foods, and both contain mineral matter.

C. Eggs have so little waste that at 50 cents a dozen they are a cheaper source of building material than the more expensive cuts of meat or the cuts with a large amount of waste. Neither meat nor eggs is an economical source of energy.

4. Digestibility of eggs.—Eggs are very easily and completely digested. Their digestibility varies somewhat according to the method of preparation.

A. Raw egg whites, contrary to the usually accepted opinion, are less completely digested than those slightly cooked.

B. Eggs cooked in different ways all seem to be completely digested, but vary in their ease of digestion with the following factors:

(1) Temperature at which cooked.—Eggs cooked just below boiling point seem more easily digested than those cooked at boiling point, and fried egg is much more difficult to digest than boiled egg.

(2) Ease of division.—When gummy or tough they elude the teeth and are not well masticated.

(3) Flavor.—When palatably and attractively prepared the secretion of the digestive juices is hastened.

These points should be borne in mind in preparing eggs, especially in cases where there is any tendency to weak digestion.

5. Cooking eggs:

A. If cooked below boiling temperature we get a softer and more palatable product. (Show how this is done in the experiments below.)

B. In an omelette a spongy texture is obtained by folding in the well-beaten egg white. These should be cooked slowly and evenly so as to set the air cells and retain the spongy texture. A slight browning of the outside develops flavor.

C. In frying eggs flavor is developed at the expense of texture.

D. The ease of digestion of hard-cooked eggs is increased by mincing.

6. Handling of eggs.—Eggs are fragile and deteriorate very rapidly so must be handled with care. It is estimated that 8 per cent, representing a cost of \$50,000,000, is lost annually in marketing. A campaign was instituted last year to cut down this loss. In the household eggs should be kept in a cool, dry place. Do not wash until just before using, since they deteriorate more rapidly after being washed.

7. Preservation of eggs and forms in which available.—Since the supply of eggs is not constant the year around, there are wide fluctuations in the price of fresh eggs according to the season. The development of methods of storage and preservation have given us a means of keeping eggs over from the time of plenty to that of scarcity and have helped to make the price more constant throughout the year.

A. Fresh eggs always bring the highest price. They may be selected by the appearance of the shell and by candling. When these are more expensive they should not be used in places where other forms will serve.

B. Cold-storage eggs are perfectly wholesome and are cheaper in winter than fresh eggs.

C. Eggs may be preserved by the housewife in water glass. (See Unit IX, Lesson 9.) These are always good for cooking.

D. Dried eggs are on the market and are extensively used by bakers. Where their preparation is under Government control and they are placed on the market in suitable containers, they might well be used more extensively, especially in custards and in baking.

E. So-called egg powders are likely to be frauds. Many of them are principally starch and coloring matter.

METHOD OF DEVELOPING LABORATORY WORK.

If this lesson is given in the spring, when eggs are plentiful, fresh eggs should be used. If given in the winter, cold-storage eggs or those preserved in water glass may be used. If desired, a demonstration on preserving eggs in water glass may be given in connection with the lesson. (See Unit IX, Lesson 9.)

Two ideas should be kept in mind for laboratory work: (1) The proper method of cooking eggs in the simpler ways, and (2) unusual and attractive egg dishes which may be served as the main dish of the meal.

EGGS COOKED IN THE SHELL.

One pint of water to 1 egg and an extra cupful for each additional egg.

Have ready a saucepan containing boiling water. Put eggs in saucepan, remove to cooler part of stove and let stand from three to five minutes, if liked soft cooked; 8 to 10 minutes for medium hard; 20 to 30 minutes for very hard cooked. Temperature of water should not exceed 82° C. (180° F.).

BAKED EGGS.

Break eggs into a buttered platter or shallow baking dish. Sprinkle cracker crumbs and grated cheese over the top; then moisten with a few tablespoons of cream. Bake in a moderate oven until the egg white is done but tender.

FOAMY OMELETTE.

4 eggs.

Butter, 1 tablespoon.

Water, 4 tablespoons.

Salt, $\frac{1}{2}$ teaspoon.

Pepper, $\frac{1}{8}$ teaspoon.

Separate yolks from whites. Beat whites until stiff. Beat yolks in a bowl with a Dover beater until thick; add salt, pepper, and water. Cut and fold the yolks into whites until the mixture is blended. Melt butter in omelette pan and when moderately hot, turn in mixture; spread evenly a little thinner in center where fold will come; place on range where it will cook slowly (about 12 minutes). Keep the temperature low until the last minute, when it may be raised to brown the bottom. When "well puffed," put pan in a moderate oven to cook the top; that is, until omelette is firm to the touch. Crease across top and fold. Serve at once. This may be served with tomato sauce, white sauce, onion, minced ham or other meat, and garnished with parsley or with jelly.

CREOLE OMELETTE.

Tomatoes, 2 (thinly sliced).

Onions, 2 (finely chopped).

Butter, 3 tablespoons.

Sugar, $\frac{1}{2}$ teaspoon.

Pepper, $\frac{1}{8}$ teaspoon.

Salt, $\frac{1}{2}$ teaspoon.

Melt the butter; add the other ingredients. Cook 20 minutes. Spread half the mixture over half of a foamy omelette. Food, place on platter, and garnish with the remainder of the tomato and onion mixture.

SHIRRED EGGS WITH RICE.

Line a shallow buttered dish with hot boiled rice. Break 6 eggs and carefully drop them one by one into the rice. Cover with 1 cup or more of white sauce to which $\frac{1}{2}$ cup of grated cheese and $\frac{1}{2}$ cup of bread crumbs have been added. Set baking dish in pan of hot water and cook in slow oven until the whites of the eggs are jellylike.

CREAMED EGGS.

Prepare white sauce and add hard-cooked eggs, cut in halves, slices, or chopped, and when hot serve on toast. A little cheese may be added for seasoning if desired.

EGGS À LA GOLDENROD.

Separate whites and yolks of hard-cooked eggs, chop whites fine, add to white sauce, and when hot serve on toast and garnish with yolks run through a sieve or ricer. Season with salt and pepper. The eggs may be mixed with the white sauce poured into a baking dish, covered with buttered crumbs, and baked until crumbs are a delicate brown.

EGGS À LA KING.

4 hard-cooked eggs.	Egg yolks, 2.
Cream or milk, 2 cups.	Canned pimentos cut in stripes, $\frac{1}{2}$ can.
Flour, 4 tablespoons.	Sautéed sliced mushrooms, $\frac{1}{4}$ cup.
Butter, 2 tablespoons.	Salt, 1 teaspoon.

Cut eggs in quarters and arrange on slices of toast. Melt butter, add dry ingredients, blend, and cook thoroughly. Add cream gradually. Cook until slightly thickened. Add remaining ingredients and pour over eggs.

CHEESE SOUFFLÉ.

Butter, 2 tablespoons.	Few grains cayenne pepper.
Flour, 4 tablespoons.	Cheese grated, $\frac{1}{4}$ cup.
Milk, 1 cup, scalded.	Yolks 3 eggs.
Salt, $\frac{1}{4}$ teaspoon.	Whites 3 eggs.

Melt butter, add flour, and when well mixed gradually add scalded milk. Then add salt, cayenne, and cheese. Remove from fire; add yolks of eggs beaten until lemon colored. Cool mixture, and cut and fold in whites of eggs beaten until stiff and dry. Pour into a buttered baking dish and bake 20 minutes in a slow oven.

LESSON 3. CUSTARDS AND CUSTARD PUDDINGS.

AIM.

To show the use of egg as a means of thickening liquids by the preparation of custards and custard puddings.

POINTS TO BE BROUGHT OUT.

1. Use of eggs in thickening:

A. When egg is mixed with liquid and heated the coagulation of the protein thickens the liquid. This coagulum is soft and remains suspended throughout the liquid unless the mixture is overcooked.

B. Part of egg used—

(1) Whole egg.

(2) Yolk gives softer coagulum on account of presence of fat.

(3) The white has approximately the same thickening power as the yolk but must be handled more carefully.

C. Proportions depend upon the thickness desired.

(1) Soft custards, 3 to 4 eggs to quart of milk.

(2) Baked custards, 4 to 6 eggs to quart of milk. The larger proportion of egg is desirable if the custard is to be turned from a mold.

2. Method of combining:

A. Heat milk in double boiler.

B. Add sugar to egg.

C. Pour hot milk into egg mixture.

D. The finishing depends upon the kind of custard.

(1) Soft custard.—Return to double boiler, stirring carefully so as to cook evenly. It is done when spoon comes out coated. As soon as done remove from hot water.

(2) Baked custard.—Pour into earthen baking dish and place in slow oven. Bake until knife inserted comes out clean.

E. If a soft custard is overcooked the condition may be partially remedied by beating with a Dover egg beater. This breaks up the coagulated particles. The finer the particles are the more likely they are to remain in suspension.

3. Custards containing starch.—When eggs are expensive, starch is sometimes used as a means of thickening to supplement the eggs. Since starch should be cooked at boiling temperature while eggs should be cooked at a temperature below boiling, the starch should be cooked with the liquid before adding the egg.

METHOD OF DEVELOPING LABORATORY WORK.

In the laboratory work, the teacher should lay especial stress on methods of combining eggs with other materials, and the importance of proper temperature in cooking.

EGGNOG.

1 egg.

Sugar, 1 teaspoon.

Milk, $\frac{3}{4}$ cup.

A grating of nutmeg.

Beat egg thoroughly; add milk and sugar and beat again. Heat in double boiler to slightly coagulate the egg white and so increase its digestibility. Serve in a glass with nutmeg grated over the surface. If ingredients have not been chilled, a little cracked ice may be added. One teaspoon of cocoa may be added or whipped cream beaten in for variations.

CUSTARD.

Milk, 1 quart.
4 eggs.
Sugar, $\frac{1}{2}$ cup.

Vanilla, $\frac{1}{2}$ teaspoon, or nutmeg.
Salt, $\frac{1}{4}$ teaspoon.

Scald the milk, beat eggs slightly, add sugar and salt, stir constantly while adding gradually the hot milk. Cook in either of the following ways:

Soft custard.—Return mixture to the double boiler. Stir constantly until mixture thickens. A custard is done when mixture coats the spoon (more easily distinguished with a wooden spoon). Strain immediately into a cold bowl, or the heat of the metal may cause continued cooking and curdling if a small amount is being made. Flavor with vanilla.

Baked custard.—Pour mixture into oiled custard cups or baking dish. Sprinkle with nutmeg. Set in pan of hot water and bake in a slow oven until firm. If a sharp-pointed knife is inserted in the custard and comes out clean, the custard is done.

VARIATIONS IN CUSTARD.

Two yolks may be used in place of 1 whole egg and the whites saved for other uses or for a meringue. Flavoring may be varied, as caramel, chocolate, coffee, etc.

FLOATING ISLAND.

Make a soft custard, using yolks. Make a meringue of half the whites and pile on top of custard when done.

MERINGUE.

Beat the eggs whites until stiff, add one-half tablespoon of sugar and a few drops of vanilla to each egg white. Drop in spoonfuls on boiling water: keep hot until meringue is set. Remove with egg whisk and place on custard.

BAKED GOLD OR SILVER CUSTARDS.

Custards may be made by using yolks or whites alone. Use twice as many yolks or whites as the usual number of whole eggs. (One whole egg to 1 cup of milk.)

CUSTARD PIE.

Pour custard mixture in partially cooked pie crust and bake in slow oven.

CUSTARD ICE CREAM.

Milk, 2 cups.
Flour, 2 tablespoons.
1 egg.

Sugar, 1 cup.
Thin cream, 1 quart.
Vanilla, 2 tablespoons.
Salt.

Mix flour, sugar, and salt. Add milk, heat, and when thick add the egg, slightly beaten. Cook as for soft custard. Cool, add cream, and flavoring. Strain and freeze. If sirup is used as a substitute for sugar, it should be added to the milk.

LESSON 4. THE USE OF MILK AND CREAM IN FROZEN DESSERTS.

AIM.

To show the women the methods of preparing simple frozen desserts from milk and cream.

POINTS TO BE BROUGHT OUT.

1. Ice creams should have flavor, body, and a good texture. .

A. Flavor depends upon the flavor of all the constituents, especially the milk or cream; and a slightly ripened cream has a better flavor than a cream that is too fresh.

B. Body is a certain feeling of richness. It is contributed to by:

(1) Age of cream.

(2) Amount of fat.

(3) In case of less rich cream, "fillers" are used to give body. Materials most used as fillers are condensed milk, milk powder, dextrin, eggs, and ground cereal products (macaroons, nabiscos, etc.), and rennin. These increase the amount of material that is in solution and dispersion in the liquid, and so increase the apparent richness of the mixture.

(4) Air incorporated in freezing increases the apparent body of the cream.

C. The texture of the cream is its smoothness and the ability to stand frozen without having crystals formed. The ice cream manufacturers call this the ability to "stand up." The texture is improved by the use of "binders." The binders in most general use are:

(1) Gelatin.

(2) Gum tragacanth.

(3) Ice-cream powders (largely dextrin).

2. Swell or overrun are the terms used to designate the increase in volume during the freezing process. This is due to:

A. Expansion on change of liquid to a solid.

B. Incorporation of air. Amount of air incorporated depends upon:

(1) Richness of mixture.

(2) Management of freezing.

3. Principles upon which the freezing of ice cream is based.

A. A mixture of ice and salt is used for freezing. The salt causes the ice to melt. In the process of melting heat is absorbed, which heat is drawn from the most accessible source, in this case the mixture to be frozen.

B. The proportion of ice to salt most generally recommended for use in the household is 3 to 1. A smaller proportion of salt, 1 part salt to 7 parts ice, may be successfully used provided both are finely divided. The larger the proportion of salt the more rapid the freezing.

4. Materials used in making the freezer are chosen so as to insure the withdrawal of the heat from the mixture to be frozen rather than from the surrounding air.

A. The mixture to be frozen is held in a container of metal, which is a good conductor, while the freezing mixture is held in the wooden container, which is poor conductor of heat.

B. The dasher has a knife edge for the purpose of removing from the sides of the freezer the mixture which freezes there first. By cutting this off the unfrozen portion of the mixture comes in contact with the cold outside and is in turn frozen. On the other side of the dasher there is a whip which serves to beat air into the mixture and keep it well mixed.

5. Technic of freezing:

A. The can should not be more than three-fourths full of the mixture in order to allow room for the necessary expansion on freezing and for the swell which is the result of the incorporation of air.

B. The air is incorporated to the greatest extent when the dasher is turned rapidly. It is held in best after the mixture has started to freeze, so the dasher may be turned slowly until that time, and then more rapidly to incorporate air.

C. After the cream is frozen the dasher should be removed and the opening stopped, freezer packed with ice, covered with a piece of carpet, and set aside for the cream to ripen.

D. Molding.—When it is desired to mold cream in fancy shapes it should be frozen as directed above, then tightly packed in molds covered with wax paper, sealed around the edges, and completely covered with a mixture of ice and salt. The molds are sealed by means of a strip of cloth dipped in melted paraffin and brought very quickly around the opening. The paraffin hardens on cooling, preventing the entrance of salt water.

6. Mousse and parfait mixtures, composed largely of whipped cream or beaten egg white, may be frozen without the use of a freezer, since the air is already incorporated. These are simply placed in a suitable container, not too thick, sealed and packed in the mixture of ice and salt. The easiest frozen dessert to prepare is the mousse. In cold weather this may be mixed the night before and frozen by placing outside. Whipped cream and beaten egg white are usually added to the hard-frozen mixture after the removal of the dasher or before packing in containers for molding.

7. Typical frozen desserts prepared from milk and cream.—The names vary in different parts of the country, but the following terms have by usage come to be rather definite:

A. Plain or Philadelphia ice cream is prepared from cream with the addition of sugar and flavoring. With the present scarcity of milk fat, it is better to use a less rich cream and modify as suggested in (B).

B. Plain cream plus a filler.—Suggested fillers are:

(1) Egg in form of custard, making so-called French ice cream.

(2) Small amount of starch or flour boiled with a portion of the milk or cream.

(3) Ground macaroons, nabiscos, cake, or cookie crumbs furnish flavor as well as body.

(4) Gelatin or dextrin.

C. Lacto creams are prepared by clotting the casein by use of rennin or precipitating it by the use of acid fruit juice or by natural souring.

The plain creams are sometimes modified by addition after freezing of whipped egg white or cream. This gives:

D. Frozen pudding is a frozen custard to which whipped cream is added. It usually has also candied fruits and nuts.

E. Nesselrode pudding is a frozen pudding containing chestnuts.

F. Parfaits are combinations of egg white and hot sirup combined as for a cake icing and whipped cream added. They are frozen in a regular freezer.

G. Mousse is prepared from sweetened flavored whipped cream. It is packed and frozen without use of freezer. This gives a characteristic texture to the product.

H. Aufait is whipped cream molded in layers with dried fruit between.

I. Milk sherbets are water ices to which milk has been added.

METHOD OF DEVELOPING LABORATORY WORK.

Have typical frozen dishes prepared, choosing those best adapted to the needs of the women in the class.

Study the construction of the freezer to be sure the women understand the purposes of the various parts. Have various types of freezers on hand for comparison. If possible, have a vacuum freezer and discuss its use.

Calculate amount of ice and salt used. Note if there is any difference in the efficiency of the different freezers.

Calculate the total cost per service and compare as to price with those purchased.

LESSON 5. CHEESE AND ITS USES IN THE DIET.

AIM.

To show the food value of cheese in comparison with some other foods and to suggest ways in which it may be served.

POINTS TO BE BROUGHT OUT.

1. Varieties of cheese.—There are more than 250 varieties of cheese made, differing in ingredients, method of ripening and seasoning; they may be grouped in the following classes:

A. Hard cheese, such as Cheddar, Edam, or Swiss.

B. Soft cheese, such as Camembert or Neufchatel.

C. Very soft cheese, such as cottage cheese.

Besides cottage cheese, the most economical variety and the most generally known in this country is American cream cheese, or Cheddar cheese, made of whole milk. Three-fourths of all the cheese made in the United States is of this variety.

2. Composition and food value:

[From United States Department of Agriculture, Office of Experiment Stations, Bulletin 28.]

Description.	Water.	Protein.	Fat.	Carbo- hydrate.	Mineral.	Calories per pound.
American cream cheese.....	<i>Per cent.</i> 34.2	<i>Per cent.</i> 25.9	<i>Per cent.</i> 33.7	<i>Per cent.</i> 2.4	<i>Per cent.</i> 3.8	1,950

Cheese, on account of its high percentage of protein and its similarity in composition to meat, is one of the best meat substitutes. It is a most concentrated and nourishing food. A pound furnishes more calories than an equal amount of any other food material, except some nuts, very fat meat, butter, and pure fats or oils. It contains more protein than average beef, twice as much as eggs, and eight times as much as milk. It contains more than twice as much fat as average beef, three times as much as eggs, and eight times as much as milk.

One pound American Cheddar cheese contains as much protein as—

1.57 pounds sirloin steak.

1.35 pounds round steak.

1.89 pounds fowl.

1.79 pounds smoked ham.

1.81 pounds fresh ham.

One pound American Cheddar cheese supplies as much energy as—

1.98 pounds sirloin steak.

2.61 pounds round steak.

2.52 pounds fowl.

1.17 pounds smoked ham.

1.29 pounds fresh ham.

The *protein* of cheese is the casein of milk, one of the most complete forms of protein. The value of milk *fat* has already been discussed (see lesson 2), and, like milk, cheese is rich in the important minerals, *calcium* and *phosphorus*.

3. Cost:

A. It takes approximately a gallon of milk to make a pound of cheese. As the price of milk has risen, so the cost of cheese has advanced. Owing, however, to the fact that cheese is a concentrated food with no waste the money spent for Cheddar cheese buys nearly twice as much food value as if spent for meat. Cheese at 40 cents a pound is a cheaper source of protein than meat at 30 cents a pound or eggs at 30 cents a dozen.

B. In the case of more expensive varieties of cheese the increase in cost is not due to any increase in nutritive value, but is paid for flavor.

4. Digestibility:

A. Cheese is a concentrated, close-textured, rich food. Many people who believe cheese is indigestible make the mistake of eating too much at one time, failing to chew it well, or eating it at the end of a heavy meal. Experiments show that 90 per cent of the protein and nearly 90 per cent of the fat are digested and absorbed (a percentage which compares well with other foods) and that it causes no digestive disturbances to an average person when properly eaten.

5. Points to remember in serving cheese:

A. Make cheese a real part of the meal and do not add it to an already adequate meal. For instance, cheese and meat are not necessary in the same meal.

B. For a well-balanced and an attractive meal cheese should be served with carbohydrate foods, such as bread, crackers, potatoes, or rice, and with crisp fruits and vegetables.

C. Use a low temperature in cooking cheese. A high temperature makes it stringy, tough, and less easily digested.

D. On account of its concentrated form cheese is more easily digested if grated and mixed with other foods. Grated cheese may be added to macaroni and other such dishes at time of serving.

6. Suggestions for cheese dishes:

A. Cheese dishes, used as meat substitutes, such as cheese loaf, cheese fondue, and welch rarebit.

B. Cheese soups and cheese and vegetable combinations.

C. Cheese salads, sandwiches.

D. Cheese pastry, cheese wafers.

METHOD OF DEVELOPING LABORATORY WORK.

The teacher should have on hand samples of different kinds of cheese and the prices per pound. Bring out the point that price is

not a sign of nutritive value, but varies with the flavor and the methods of making.

In some localities where there is an abundance of milk it may be worth while to give, in connection with this lesson, a demonstration on the making of Cheddar cheese, or directions for the process may be given to the women and the cheese made by them at home and brought to class later. Directions for making Cheddar cheese may be obtained in the reference material.

BOSTON ROAST.

Kidney beans or equivalent quantity of	Bread crumbs.
cooked beans, 1 pound can.	Salt.
Grated cheese, $\frac{1}{2}$ pound.	

Mash the beans or put them through the meat grinder. Add the cheese and sufficient bread crumbs to make the mixture stiff enough to be formed into a roll. Bake in a moderate oven, basting occasionally with butter and water. Serve with tomato sauce. This dish may be flavored with onions, chopped and cooked in butter and water.

NUT AND CHEESE ROAST.

Grated cheese, 1 cup.	Butter, 1 tablespoon.
Chopped English walnuts, 1 cup.	Juice of $\frac{1}{2}$ lemon.
Bread crumbs, 1 cup.	Salt and pepper.
Chopped onions, 2 tablespoons.	

Cook the onion in the butter and a little water until it is tender. Mix the other ingredients and moisten with the water in which the onion has been cooked. Pour into a shallow baking dish and brown in the oven.

CHEESE AND VEGETABLE SOUP.

Vegetable stock, 2 cups.	Scalded milk, 1 cup.
Finely chopped carrots, 2 tablespoons.	Cheese, $\frac{1}{4}$ cup, grated.
Chopped onion, 1 tablespoon.	Butter, 2 tablespoons.
A very little mace.	Salt, $1\frac{1}{2}$ teaspoons.
Flour, 2 tablespoons.	

Cook the vegetables a short time in one-half of the butter, add the stock and the mace, boiling 15 or 20 minutes. Strain and add the milk. Thicken with flour cooked in the remaining butter. Just before serving stir in the cheese. Serve immediately.

CHEESE SAUCE.

Milk, 1 cup.	Cheese, 1 ounce ($\frac{1}{4}$ cup grated cheese).
Flour, 2 tablespoons.	Salt and pepper.

Thicken milk with the flour, and just before serving add the cheese, stirring until it is melted.

This sauce is suitable to use in preparing creamed eggs or to pour over toast, making a dish corresponding to ordinary milk toast, except for the presence of cheese. It may be seasoned with a little curry powder and poured over hard-boiled eggs or over cooked vegetables, such as cabbage or cauliflower. Cold boiled potatoes may be cut in dice and reheated in the sauce.

CHEESE FONDU.

Hot milk, 1 cup.

Bread crumbs, 1 cup.

Fat, 1 tablespoon.

Cheese (grated), 1 cup.

3 eggs.

Salt, $\frac{1}{2}$ teaspoon.

Mix the milk, fat, salt, cheese, and bread crumbs. Add the beaten egg yolk, and finally fold in the stiffly beaten egg whites. Bake in a greased baking dish in a moderate oven.

WELCH RAREBIT.

Butter, 1 tablespoon.

Mild cheese, $\frac{1}{2}$ pound.Mustard, $\frac{1}{4}$ teaspoon.

1 egg.

Cayenne, few grains.

Milk, $\frac{1}{3}$ to $\frac{1}{2}$ cup.Salt, $\frac{1}{4}$ teaspoon.

Put butter in saucepan, and when melted add seasonings and cheese cut in small pieces. As cheese melts, add milk gradually, then egg slightly beaten. Serve on toast or crackers.

LESSON 6. THE USE AND PREPARATION OF COTTAGE CHEESE.

AIM.

To give methods of making cottage cheese and ways of serving it.

POINTS TO BE BROUGHT OUT.

1. Reasons for using cottage cheese:

A. A convenient and economical means of using for food skim milk, which is frequently considered a waste product.

B. A product which is easily made with utensils found in every home.

C. Furnishes the valuable protein of milk in a solid form adapted to uses different from those of milk.

D. A much cheaper animal food than any form of meat. As a source of building material 1 pound of cottage cheese equals:

1.27 pounds sirloin steak.

1 pound round steak.

1.37 pounds chuck rib beef.

1.46 pounds fresh lamb.

1.44 pounds smoked ham.

1.58 pounds loin pork chops.

1.31 pounds hind leg lamb.

1.37 pounds breast of veal.

E. While cottage cheese furnishes somewhat less energy than a corresponding amount of meat it is a cheaper form of energy than most meats at present prices. As a source of energy 1 pound of cottage cheese equals:

8 $\frac{1}{2}$ ounces sirloin steak.11 $\frac{1}{4}$ ounces round steak.11 $\frac{1}{4}$ ounces chuck rib beef.10 $\frac{3}{4}$ ounces fowl.5 $\frac{1}{2}$ ounces fresh ham.

5 ounces smoked ham.

6 ounces loin pork chop.

7 $\frac{1}{2}$ ounces hind leg lamb.12 $\frac{1}{2}$ ounces breast of veal.

F. The constituents of cottage cheese are in a very digestible form. Cottage cheese is much lower in fat than Cheddar cheese, but this deficiency is supplied when cream is used in its preparation, as is the usual method.

2. Methods of making cottage cheese.—There are two methods for making cottage cheese, one known as the ordinary sour-milk process, the other called the rennet process. The latter gives a finer and more uniform texture and requires less time and attention in making. The milk may or may not be pasteurized. If milk is pasteurized first by heating to 63° C. (145° F.), and holding at that temperature for 30 minutes, a starter must be used.

A. Ordinary sour-silk process.—Allow clean skim milk to sour naturally or use a “starter” (milk containing lactic acid bacteria), about two tablespoons to a quart of milk. Keep at a temperature of 24° C. (75° F.) until curdled. This is about 30 hours or more without a starter or 12 to 15 hours with a starter. Stir with a spoon or cut curd and heat to 38° C. (100° F.) for 20 to 30 minutes. A thermometer should be used to insure success. Stir occasionally. *Do not let milk get any hotter, for a higher temperature toughens the curd.* When whey begins to separate and come to the top it is time to drain. Pour upon cheesecloth or into a fine strainer. Drain for 20 to 30 minutes, squeezing or moving curd to assist draining. Add one teaspoon of salt to the cheese from two to three quarts of milk. Add sweet or sour cream and mix with curd thoroughly.

B. Rennet process.—Liquid rennet, junket tablets, or pepsin may be used to produce coagulation sooner than in the previous process. A starter may be used if desired. Two or three drops of liquid rennet to hasten process or one-eighth of a junket tablet dissolved in one tablespoon of cold water are used to a gallon of milk. Warm to 24° C. (75° F.) and keep at that temperature until curdled: then pour upon a cheesecloth without cutting or further heating. Drain, press, and season.

3. Uses for cottage cheese:

A. Sandwiches—

Lettuce and cottage cheese.

Nut and cottage cheese.

Jelly and cottage cheese.

Pimento, olive, or pickles and cottage cheese.

Raisin, fig, date, and cheese paste.

Club sandwich with cottage cheese.

B. Salads and salad dressing—

Nut and cheese balls.

Tomatoes stuffed with cheese.

Pepper rings stuffed with cheese.

Prunes, dates, stuffed with cheese.

Peaches or pineapple with cheese balls and nuts.

Celery and cheese.

Cottage cheese salad dressing.

C. Main dishes—

Served plain with cream or top milk.

Cheese loaf.

Cheese sausage.

Cheese omelette or soufflé.

Scrambled eggs with cottage cheese.

D. Desserts—

Cottage cheese tarts.

Cottage cheese pudding.

Cottage cheese pie.

Cheese custard.

Served with cream and sugar, or preserved or fresh fruits.

4. Uses for whey.—The whey contains more than one-fourth the total food value of the milk and should not be wasted. It may be used:

A. As the liquid in boiled salad dressing.

B. As the liquid in cornstarch or tapioca pudding.

C. As the liquid in gelatin desserts.

D. As the liquid in yeast bread.

E. In beverages.

F. In whey honey, as a sirup for hot cakes.

G. Whey ice.

METHOD OF DEVELOPING LABORATORY WORK.

Cottage cheese should be made in class by both methods. Since the time required for the setting of the milk is much longer than the laboratory period, two members of the class may be asked to set the milk for the cheese at home according to directions furnished by the teacher, and to bring the curdled milk to class, where the cheese is to be made. Have the cheese made by the two processes compared as to (1) texture, (2) flavor, (3) amount of time and attention required.

In selecting recipes, a part of those given may be used for class practice and the women asked to try others at home and report their success.

CHEESE DRESSING.

Oil, 6 tablespoons.

Vinegar, 1½ tablespoons.

Salt

Cottage cheese, ½ cup.

Chili sauce, 2 tablespoons.

Paprika.

Combine the oil and vinegar and beat thoroughly. Add cheese and seasonings and mix well. Pour over head lettuce.

CHEESE CUSTARD.

Milk, 1 cup.	Cold water, 2 tablespoons.
One egg.	Vanilla, $\frac{1}{2}$ teaspoon.
Sugar, sirup, or honey, 1 tablespoon.	Cottage cheese, 1 cup.
Gelatin, 1 teaspoon.	Salt.

Heat the milk, pour it gradually over the beaten yolk of egg, add the sweetening, and cook the mixture until it coats a spoon. Soak the gelatin in the cold water; dissolve it by setting the cup in boiling water. Beat the white of egg until it is light, add the vanilla and the dissolved gelatin. Beat the mixture until it is very stiff. Fold this into the custard mixture. Chill the pudding. Just before serving it, add the cheese, slightly salted.

COTTAGE CHEESE PIE.

Cottage cheese, 1 cup.	Yolk of 2 eggs, beaten.
Sugar, $\frac{1}{2}$ cup.	Melted butter, 2 tablespoons.
Honey, $\frac{1}{4}$ cup.	Vanilla, $\frac{1}{2}$ teaspoon.
Milk, $\frac{3}{8}$ cup.	Salt.

Mix the ingredients in the order given. Bake the pie in one crust. Cool it slightly, cover it with meringue, and brown it in a slow oven.

COTTAGE CHEESE LOAF.

Cooked kidney beans, 1 cup	Chopped onion, 1 tablespoon.
Cottage cheese, 1 cup.	Fat, 1 tablespoon.
Ground peanuts, 1 cup.	Tomato juice, 1 cup.
Bread crumbs, 1 cup.	Salt.
Boiled rice, 1 cup.	Pepper.

Mix the ingredients well and form the mixture into a roll. Brush it over with melted fat, and bake it in a moderate oven for 25 minutes. Serve the loaf with a medium thick white sauce, to which may be added 2 tablespoons of minced sweet red pepper.

COTTAGE CHEESE SAUSAGES.

Cottage cheese, 1 cup.	Thyme, $\frac{1}{2}$ teaspoon.
Bread crumbs, 1 cup or cold cooked rice, $\frac{1}{2}$ cup, and bread crumbs, $\frac{1}{2}$ cup.	Milk, 1 tablespoon.
Peanut butter, $\frac{1}{4}$ cup, or savory fat, 2 tablespoons.	Soda, $\frac{1}{2}$ teaspoon.
Coarsely chopped peanut meats, $\frac{1}{4}$ cup.	Finely chopped onion, 1 tablespoon.
Powdered sage, $\frac{1}{2}$ teaspoon.	Salt, 1 tablespoon.
	Pepper, $\frac{1}{4}$ teaspoon.

The bread crumbs may be made from left-over corn, barley, or other quick breads. Cook the onion in the fat until tender, but not brown. Dissolve the soda in the milk and work into the cheese. Mix all other ingredients thoroughly with the bread crumbs. Blend peanut butter and onion with the cheese, and mix with them the bread crumbs. Form into flat cakes, dust with bread crumbs or corn meal, and fry a delicate brown in a little fat in a hot frying pan.

Variations.—To utilize left-over cereals, use 1 cup cooked rice, oat meal, or corn-meal mush with three-fourths cup of bread crumb mixture. Dry corn meal or finely ground oat meal may be used for stiffening the above mixture, but in

such case it is better to form into a loaf and bake it in the oven about 25 minutes.

Other seasonings may be used in place of the above. The amount of liquid will vary in every case. The mixture should be very stiff, since the cheese tends to soften it during the cooking.

COTTAGE CHEESE OMELETTE.

Two eggs.	Milk, 2 tablespoons.
Chopped pimentos, 1 tablespoon.	Soda, $\frac{1}{8}$ tablespoon.
Cottage cheese, 3 rounded tablespoons.	Salt, $\frac{1}{2}$ teaspoon.

Beat the yolks and whites of the eggs separately. Add to the yolks the salt, the milk, and the cheese, with which have been blended the pimentos; finally fold in the stiffly beaten whites; pour into a hot frying pan, in which has been melted about one-half tablespoon fat. Cook the omelette slowly until the egg has set; place in the oven for a few moments to finish cooking and fold over in the center. Garnish with parsley. Other seasoning may be used, such as chopped parsley, green pepper, or minced ham.

WHEY LEMONADE.

Whey, 4 cups.	Slices of lemon, or a little grated or
Sugar, 6 tablespoons.	diced rind, nutmeg, or cinnamon.
Two lemons.	

WHEY HONEY.

Whey, 1 cup.	Sugar, $\frac{1}{2}$ cup.
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Mix whey and sugar and boil the mixture until it is of the consistency of strained honey. This sirup will keep indefinitely, if properly bottled, and is delicious for spreading on waffles or pancakes. Used a little thinner it makes an excellent pudding sauce. Since it requires no thickening it is the easiest possible sauce to make.

LESSON 7. THE LUNCHEON OR SUPPER MENU.

AIM.

To prepare menus for luncheon or supper, using eggs and dairy products as substitutes for meat.

POINTS TO BE BROUGHT OUT.

1. In the preceding lessons eggs, milk, and cheese have been shown to be as good forms of tissue-building foods as meat. They may therefore be substituted for meat dishes in a meal for variety or when meat is expensive.

2. Luncheon or supper menus should be planned with few dishes, for the sake of simplicity and economy. This is a good place for "one-dish" meals.

3. In planning the menu take into consideration—

A. Time of day to be served; if for luncheon at noon or for supper in the evening. This affects the amount and kind of food to be served.

B. Ease of preparation; if dinner is the heavy meal of the day, both breakfast and luncheon should be simplified.

C. Proper balance of foods. (See Unit XII, Lesson 3.)

METHOD OF DEVELOPING LABORATORY WORK.

Have planning and preparation of meatless menus which will illustrate the principal points taught in this unit. Endeavor to have these meals pleasing and avoid monotony in character and flavor. The following suggestions for menus may be used or the women may be asked to bring in menus for criticism:

1. A noon or evening lunch for winter.
2. A noon or evening lunch for summer.
3. A Sunday evening supper which may be prepared in advance and served with little preparation at meal time.

I.	II.	III.
Cheese soufflé.	Cheese omelette.	Cottage cheese salad.
Popovers.	Baked potato.	Cucumbers.
Cocoa.	Green vegetable.	Thin bread and butter.
Stewed fruit.	Fruit.	Iced tea.
		Fresh fruit.

REFERENCES.

U. S. Department of Agriculture:

- Farmers' Bulletin 413. Care of Milk and Its Use in the Home.
 Farmers' Bulletin 363. Use of Milk as Food.
 Farmers' Bulletin 128. Eggs and Their Use as Food.
 Farmers' Bulletin 487. Cheese and Its Economical Use in the Diet.
 Farmers' Bulletin 850. How to Make Cottage Cheese on the Farm.
 Farmers' Bulletin 960. Neufchatel and Cream Cheese; Farm Manufacture and Use.
 States Relations Service, Bulletin 471. Eggs and Their Value as Food.
 Circular 109. Cottage Cheese Dishes.
 Department Bulletin 177. The Production and Consumption of Dairy Products.

Bureau Animal Industry:

- Bulletin 319. Fermented Milks.
 Bulletin 342. The Present Status of the Pasteurization of Milk.

UNIT V.

Fats.

GENERAL INFORMATION.

1. A world shortage in fats.—There is a world shortage of 1,500,000 tons of fats. The chief fats of export are dairy products, pork products, and vegetable oils. The shortage in animal fats is due to the same conditions that have brought about a meat shortage in Europe—the destruction of herds by the enemy, the killing of animals for food because of the general food shortage and because of the lack of animal feeds. The high protein feeds necessary for dairy cattle especially are lacking; of these there is a world shortage of 3,000,000 tons. The production of vegetable oils in southern Europe was considerably decreased during the period of the war.

2. Need of fats in the diet.—Fats are an absolute necessity in the diet. With too little there is malnutrition and diminished resistance to disease. Fats enter largely into the food needs of men and women in heavy industry because of their high energy value. They are also important psychologically. Most peoples are accustomed to so general a use of fat in cooking that they are dissatisfied without it.

3. The production of fats in the United States.—The United States is the only country of all those which were engaged in the war which has a surplus of fats. We have animal fats far beyond our needs. Normally we export about one-third of the lard we produce. In normal times we export very little butter, but the exportation of butter has greatly increased since the war: Butter exports, 1913, 3,585,600 pounds; 1917, 26,835,092 pounds. Of oleomargarine we export normally about half as much as of butter, and these exports are increasing, but we export a large quantity of oleo oil to be made into oleomargarine abroad.

The large reserve stores of fats in America are the vegetable oils, in which the development of industry has recently brought about a great variety—oils made from cottonseed, corn, peanuts, coconuts, etc. There has been a tremendous increase in the manufacture and export of these since the beginning of the war.

4. Need of an economical use of fats.—Until recently the fats have been consumed in excessive quantities in this country and so wantonly wasted that the utilization of fats from the garbage of large cities has been a highly profitable industry. This waste has been

markedly reduced. It must be reduced still further, however, and our consumption of fat must be lessened in order that from our plenty we may help to meet the serious needs of other countries.

LESSON 1. THE SELECTION OF FATS; METHOD OF HANDLING WASTE FATS IN THE HOME.

AIM.

To show the place of fat in the diet, to point out possible economies in the use of table fats, and to show how to prepare meat fats for use in cooking.

POINTS TO BE BROUGHT OUT.

1. Use of fats in the diet:

A. Some fat should be included in each day's meals because—

(1) Fat is a high *energy*-producing or fuel food. People who do much physical work need generous amounts of fat. An ounce of fat supplies the body with energy to do two and one-fourth times as much muscular work as does an ounce of sugar or of starch.

(2) Certain of the animal fats contain one of the substances called "growth substances," "vitamines," etc., that are believed to be essential for growth and maintenance of health. This essential substance has been called "fat soluble A," and is found in glandular organs, milk fat, and the fats in egg yolk.

(3) Fat improves the quality of the diet by improving the flavor and texture of many foods, thus making possible a greater variety in cooking. Frying, roasting, the making of sauces and gravies, and the making of cakes, pastries, and quick breads all require fat.

(4) Fat increases the "staying" quality of a meal by increasing the length of time it takes the stomach to digest it. This means that the "hunger pangs" which occur at regular intervals in a completely empty stomach are not felt so early when the meal contains some fat.

B. Too much fat in the diet predisposes to chronic indigestion, especially in the case of children. Care should be taken to avoid an excess of fat in the family meals.

2. Kinds of fat commonly used in the household:

A. Animal fats, such as butter, lard, suet.

B. Vegetable fats, such as olive oil, corn oil, cottonseed oil, various nut oils, and hardened fats made from these oils and fish oils by a commercial process.

C. Considerable amounts of both animal and vegetable fats are supplied to the diet from various foods which the housewife frequently overlooks in estimating the fat requirement of her family. Such foods are egg yolk, cream, cheese, meats, chocolate, soy beans, and nuts.

3. Table fats:

A. Food value of butter.—Although butter is generally used for the table for the sake of its flavor, from the standpoint of the dietitian it is a very important food, for butter fat contains in generous quantities one of the substances so essential for growth and health. For this reason butter is an important part of the diet of children and adults. If other fats must be substituted for table butter, care should be taken that the diet includes plenty of whole milk, eggs, and leaf vegetables if the deficiency in this “dietary essential” is to be met.

B. Ways of extending the butter flavor.—If it is not possible to afford the normal and desirable supply of butter for table use there are various ways of extending the butter flavor over mixtures consisting only partly of butter. Such “merged butters” are usually made by combining equal parts of softened butter and whole milk. The process results in apparently doubling the amount of butter, and while the mixture has an agreeable flavor and a butterlike texture it must be remembered that the food value of the original ingredients is not altered and that the mixture has not the same food value as an equal measure of butter.

C. Butter substitutes.—There are many brands of butter substitutes on the market, made from various combinations of animal and vegetable oils and fats, churned in milk to obtain the butter flavor. These are good, wholesome products and may be safely used in the mixed diet.

4. Cooking fats:

A. Beside the fats commonly used for cooking, such as lard and compounds, the housewife should make use of all excess meat fats, both for the sake of conservation and of economy. She should insist that all meat trimmings paid for be sent home. All fat that can be spared from steaks, chops, or roasts should be cut off before cooking, covered, and set aside in a cold place until enough to be rendered has been collected. A surprising quantity can be accumulated in a short time without spoiling the flavor or juiciness of the meat. Fat from chickens or other fowls may be used in the same manner.

B. Any fats that have a decided flavor may be improved by rendering with sweet milk.

C. Fats with decided flavors may also be made into savory fat and used for sautéing or gravy making.

D. Some fats, such as beef suet or mutton fat, are too hard to be used conveniently in cooking. These may be rendered with a softer fat, such as a vegetable oil, or the two may be mixed after the suet is rendered to obtain a fat of any desired consistency.

E. The cracklings left from rendering suet should not be thrown away. They contain sufficient fat to make them valuable in cooking. Four to six tablespoons of cracklings are equivalent to one tablespoon of clear fat. They may be ground, salted lightly, and stored in glass jars until needed. These are especially desirable in the preparation of corn bread and are good served with baked potato.

5. Economical use of fats:

A. Even a small saving of fat is important. Every bit saved by careful management helps to make the world's supply go further and helps to lessen the household bills. Some of the ways of saving fat in the household are—

(1) Train the members of the family not to take more butter than they need. Any butter left over on the plate may be saved and used for special cooking.

(2) Trim excess fat from meat before cooking. It is liable to become overheated during the cooking process and will not be so good.

(3) Meat skins, bacon rind, or trimmings of ham may be used in seasoning turnips, greens, cabbage, or beans.

(4) Use only the necessary amount of fat in making gravies for meat. Excess fat should be poured off and used for other things instead of being left to float on top of the gravy.

(5) Keep a covered jar in the kitchen into which may be drained small amounts of fat from cooking pans which would otherwise go into the dishwater.

(6) The use of a small brush or bit of paper in oiling pans will spread the fat evenly with no excess.

(7) Cover fats in an opaque dish and place in a cool, dark place to keep them fresh and sweet.

(8) Use less fat in cooking; less pastry, less fried food, less fat in any recipe.

(9) Watch the meals to see that an unnecessary amount of fat is not supplied. If a fat meat or a rich gravy is served, butter can be omitted.

(10) Check up on the amount of fat used in the family and compare it with the safe minimum allowance. (Unit X, Lesson 2.) If necessary, reduce the family allowance of fat.

NOTE.—The teacher may ask the class for other suggestions as to practical economies in the use of fats.

METHOD OF DEVELOPING LABORATORY WORK.

Have on exhibit as many as possible of the following kinds of fat: Beef kidney, beef flank, lamb or mutton, pork, and chicken. These will illustrate the difference in color and hardness between the fat of different animals and even of different parts of the same animal. These may later be used by the class to illustrate the rendering of fat. Each member may render one kind of suet. The suet should be weighed before rendering, and the fat and cracklings obtained should be weighed separately. Have the women calculate the cost of the fat, and discuss with them the economy of buying suet to be rendered and also of trimming meats before cooking.

The blending or merging of butter may be demonstrated by the teacher. Omit this entirely if the class is familiar with the process.

RENDERING FAT.

Put the suet or meat trimmings through a meat chopper or chop it fine with a knife. If it has a strong odor, soak it awhile in salt water before rendering, and add a pinch of soda during the rendering process. Render in a double boiler or in a pan set in the oven or on the back of the stove until the fat can be pressed from the tissue or cracklings. Strain off the clear fat, squeezing out as much as possible from the cracklings. Fat keeps better if it has not been heated to too high a temperature. Store in clean tin pails or crocks, tightly covered, in a cool place.

REDUCING THE FLAVOR OF FATS.

Mutton or beef fat may have the characteristic flavor reduced by rendering with one-half as much sweet milk (by measure). The flavor of mutton fat may be satisfactorily disguised by browning in it slices of apple. The apple is palatable enough to be served as fried apple.

CLARIFYING FATS.

Rendered fats may be clarified by mixing with cold water, allowing to heat up slowly to boiling, stirring frequently, then set aside to cool. Lift off the cake of clarified fat from the top and reheat to drive off any moisture so that it will keep.

SAVORY FAT.

Strong-flavored fats may be made into savory fats by adding to each pound of suet, in rendering, one small whole onion, a sour apple sliced thick, and a scant teaspoon of ground thyme or mixed herbs tied in a cloth. Other combinations of seasonings may be used.

SOFTENING A HARD FAT.

To two or three parts of hard fats, such as beef or mutton, mix one part of soft fat, such as lard, chicken fat, or vegetable oil. The amount will depend upon the relative consistencies. The mixing may be accomplished by rendering the two kinds of fat together or by stirring the melted fats together. Stir the mixture at intervals during cooling.

FRIED MUSH WITH CRACKLINGS.

Yellow cornmeal, 1 cup.

Cracklings, $\frac{1}{2}$ cup.

Flour, 2 tablespoons.

Boiling water, $3\frac{1}{2}$ cups.

Salt, $1\frac{1}{2}$ to 2 teaspoons.

Mix cornmeal and flour and sift it into the boiling salted water. Cook over direct heat until it thickens; then finish over hot water or in a fireless cooker. Just before molding in a dish moistened with cold water, stir in the cracklings. Let stand until solid; then cut and fry as ordinary mush. A little cheese may be stirred into the mush before molding, if desired.

LESSON 2. THE USE OF HOME-RENDERED FATS IN COOKING.

AIM.

To show how home-rendered meat fats may be used in cooking.

POINTS TO BE BROUGHT OUT.

1. The modern housewife has almost lost the art of utilizing home-rendered meat fats in cooking. The advancing cost of living makes it important that all meat fats be saved and substituted in cooking for the more familiar commercial fats.

A. The characteristic flavor of a fat may be utilized. Instead of throwing away ham or bacon fat on account of its smoky flavor, they may be used in dishes to which they give distinctive flavors. These include eggs or potatoes, scrambled eggs, Spanish sauce, cornbread, baked beans, baked peas, bean or pea soup. These fats are also useful for seasoning spinach or other greens or for use in hot dressing for salads. (See Lesson 5.)

B. The unpleasant flavor of some fats may be disguised or reduced. Savory fats or mutton fats rendered with milk (Lesson 1) may be used for frying or sautéing or for making gravies or sauces. (Sausage fat is an example of savory fat.) Strongly-flavored fats, like ham, bacon, or mutton, may be used in highly-seasoned mixtures, such as gingerbread or chocolate cake.

C. Hard fats, when softened, may be used to take the place of more usual fats in making bread, cake, and pastry.

(1) Butter and lard are usually used for making bread, cake, and pastry, because they are soft enough to mix readily and evenly with other ingredients and do not harden enough to make the flour mixture crumbly if it stands for any length of time.

(2) Hard fats, such as beef-kidney fat, lamb or mutton fat, are not satisfactory in their natural state for use in flour mixtures, because they must be melted to mix easily, and they

harden rapidly, producing a crumbly mixture. If they are mixed with a softer fat (Lesson 1) to make a compound with the approximate consistency of lard or butter, they may be used in any bread, cake, or pastry.

(3) Some natural fats are soft enough to be used unmodified in flour mixtures. These are the vegetable oils, such as cottonseed, corn, and peanut, chicken fat, and beef-flank fat, sometimes called "cod suet." The chicken fat may be clarified as directed in Lesson 1. It is especially prized as a butter substitute in cake and pastry making.

(4) Method of substituting other fats for butter in flour mixtures.—Butter is not all pure fat. Nearly one-fifth of its weight is made up of water, curd, and salt. When substituting pure fats, like beef drippings, lard, or oil, use about one-fifth less and add extra salt.

METHOD OF DEVELOPING LABORATORY WORK.

This lesson may be used not only to suggest methods of using fats but also desirable methods of cooking bacon in order to recover the fat for household use. The class may demonstrate the cooking of bacon by the two methods given below and reserve the fat to be used (in addition to the fats left from the preceding lesson) in demonstrating the dishes suggested.

(1) Bake the bacon in a pan or on a rack set in a pan in a hot oven. (Economy in fuel may be suggested by using oven already heated for toast or biscuits.)

(2) Fry in deep fat in a small saucepan in which fat is allowed to accumulate. The pan should be covered while the fat is heating and cooling. The advantages of this method are: The fat heats quickly, little odor escapes, the bacon is quickly and evenly cooked, loss of fat is prevented by storing in the same dish in which it is used, and the fat can be taken out from time to time for use in cooking.

The bacon should be weighed before cooking and the fat weighed. Have the women calculate its cost value when substituted for butter or lard in cooking, the cost of a slice of bacon when the fat is wasted, and the reduction in actual cost of the bacon when the fat is utilized.

Have the pupils make gingerbread and chocolate drop cakes, using any standard recipe or those given in Unit VII, Lessons 5 and 8, and Unit VIII, Lesson 3. In the gingerbread substitute bacon fat for the fat called for; in the chocolate drop cakes use the fat compound left from Lesson 1 or use a mixture of one part bacon fat and two parts mutton fat. While the cakes are baking the recipes given below may be demonstrated.

BROWN GRAVY.

Use only as much fat as the flour will "bind"; never more than equal parts. Good proportions are $1\frac{1}{2}$ to 2 tablespoons fat, 2 to 3 tablespoons flour, 1 cup water or stock. If an excess of fat is used, it will rise to the top of the gravy. Mix flour with the fat and brown, avoiding scorching. A pinch of sugar browned in the hot pan will give the gravy a rich brown color and will improve the flavor. Add hot water or stock and simmer 5 to 10 minutes. Season with salt, pepper, and other desired seasonings, such as celery leaf, bay leaf, slice of onion, spoonful of tomato catsup or canned tomatoes. Savory fat is excellent for making brown gravy.

SPANISH SAUCE.

1 green pepper.	Sugar, 1 to 2 teaspoons.
1 red pepper.	Water, 1 cup.
1 small onion.	Canned tomatoes, 1 cup.
Bacon or other fat, 2 tablespoons.	Salt and pepper.
Flour, $1\frac{1}{2}$ tablespoons.	6 chopped mushrooms, if desired.

Chop the onion and pepper, simmer for five minutes in the fat, then add water and tomatoes and cook until the onion and peppers are tender. Thicken with the flour blended with $\frac{1}{4}$ cup water and cook five minutes longer to blend the flavors. If fresh peppers are used, they may be parboiled for five minutes if the strong flavor is disliked.

LESSON 3. THE USE OF FAT IN PASTRY.

AIM.

To give the general rules for successful pastry making, and to suggest ways of using less pie crust and less fat in pie crust.

POINTS TO BE BROUGHT OUT.

1. The use of pastry is to be discouraged both from the standpoint of the uneconomical use of fat involved and its indigestibility. In any case only simple pastry should be given and preferably the one crust pies.

2. The amount of shortening used in the crust should be reduced. This can be done more successfully than the average housewife realizes.

3. Points in making pie crust:

A. Mixing:

(1) Use the best flour. Many cooks prefer pastry flour.

(2) Skilled pastry cooks differ as to the fat to be preferred. Butter, lard, mixtures of the two, clarified chicken fat, clarified beef flank fat, and various commercial fats may be used. The

fat must be soft enough to mix well, yet not too soft. Vegetable oils are used by some pastry cooks, but they require skillful handling for good results.

(3) Have all ingredients cold and work on a cold surface. Pastry is usually improved by chilling dough before rolling it out.

(4) Standard rules usually call for one-half to one-third as much fat as flour, by measure. Satisfactory pastry may be made by using one-fourth as much fat as flour, by measure. During the fat shortage not more than this amount should be used. When amount of fat is reduced, a little baking powder may be added to make the crust flakier.

(5) Mix and sift flour and salt, and baking powder if it is used.

(6) Add the shortening, cutting it in with a knife. Some cooks work it in lightly with the tips of the fingers.

(7) Measure out the liquid called for in the rule and add three-fourths of it to the mixture. The general proportion is somewhat less than one-fourth cup of very cold water to one cup of flour. Too much water makes the pastry tough. Stir briskly with a knife to mix evenly and avoid toughening of the dough.

By this time most of the dough will be sticking together in little separate rolls. If in pressing these lumps together they should not only cling together but readily collect about them whatever loose flour there may be, sufficient water will have been added; but as long as the mixture when pressed remains to some degree crumbly, it is a sign that more water is required. A sure sign of its having been properly mixed is that the dough can be rolled into a lump and the basin wiped out cleanly with it as with a cloth.

B. Rolling out:

(1) Flour pastry board slightly, lay dough on it and shape into a neat, flat, oblong shape.

(2) First press dough out a little with rolling pin; then roll to required thickness with short, quick strokes, bringing the roller down rather sharply at beginning of each stroke to drive the paste in front of it. In rolling always stop just short of the edge of the crust. Always roll straight forward. To change shape of dough, don't roll obliquely but change position of dough on the board. (An excellent modification of this procedure is given below under rule for fat-saving pastry III.) Roll thin.

(3) Handle and roll as little as possible. Ordinary pie crust requires but one rolling; flaky pastries or puff pastes require several.

C. Baking:

(1) Bake in a hot oven 278° C. (500° F.).

(2) Crust for a one-crust pie is often baked separately on the inverted pie tin and pricked to prevent bubbles forming in it. Good results are obtained by brushing the uncooked crust with slightly beaten white of egg before filling it.

(3) Perforated pie tins and pie plates made of heavy wire netting allow the heat to reach the crust evenly and quickly.

D. General rules:

(1) One cup of flour makes enough crust for two small single crust pies or one medium-sized double-crust pie.

(2) Flakiness depends largely upon the amount of fat used.

(3) Lightness depends largely upon the mixing and rolling.

(4) Tenderness depends upon the flour and the skill in mixing. Too much water tends to make the crust tough.

METHOD OF DEVELOPING LABORATORY WORK.

If the class includes a few skillful pastry cooks, draw out from them the general principles of successful mixing, rolling, and baking. Do not allow too much time for description of details of individual preferences in ingredients or manipulation.

At least two of the fat-saving pastries should be made in class. If possible, let each person mix enough for a small one-crust pie to take home, and bake separately one or two small strips of the crust to determine flavor and texture of pastry. Any rule may be used that does not require too much fat. Rendered beef fat, a mixture of beef fat and lard, clarified chicken fat, and hardened vegetable fat (commercial) may be used by different members of the class and the pastry compared as to flavor and texture.

FAT-SAVING PASTRY I.

(Two small single-crust pies.)

Flour, 1 cup.

Ice water.

Fat, $\frac{1}{4}$ cup.

Salt, $\frac{1}{2}$ teaspoon.

Butter, lard, a hardened fat, oleomargarine, drippings, chicken fat, refined oils, or combinations of two or more may be used for the fat.

Sift flour, measure and sift flour and salt. Cut in shortening with two knives. Add water to make a stiff dough. Chill, roll out on floured board.

FAT-SAVING PASTRY II.

(Hot-water paste; two small single-crust pies.)

Flour, 1 cup.

Baking powder, $\frac{1}{4}$ teaspoon.

Fat, 4 tablespoons.

Salt, $\frac{1}{2}$ teaspoon.

Boiling water, 3 tablespoons.

Sift flour, salt, and baking powder into basin; rub fat lightly into them; then stir in boiling water. Cool paste before using it, or it will be too sticky to handle.

FAT-SAVING PASTRY III.

(Four small single-crust pies.)

Baking powder, $1\frac{1}{2}$ teaspoons.
 Flour, $2\frac{1}{4}$ cups.
 Fat, $\frac{1}{2}$ cup.

Lemon juice, 1 teaspoon.
 Cold water.
 Salt, $\frac{1}{2}$ teaspoon.

Sift and mix together flour, salt, and baking powder. Chop fat in or rub it in with finger tips. Chill two hours. Then take out one-half cup and to remainder add lemon juice and cold water gradually to make stiff paste. Knead lightly and roll into a long, narrow strip. Sprinkle dough with half of reserved mixture and fold so as to make three layers. Turn halfway around, roll again into a strip, sprinkle with rest of mixture, and fold as before. Roll and fold twice more and bake.

DEEP-DISH APPLE PIE.

Line a deep pie plate with crust, building it well up around the edges. Bake crust separately, or before filling; brush with slightly beaten white of egg, then fill with apples that have been stewed with sugar, and a little seasoning. Lemon juice and grated rind, or cinnamon or nutmeg make good additions. In normal times a little fat is added to the apples.

Serve plain or with cream or cover with meringue and place in hot oven until brown.

BUTTER SCOTCH PIE.

(One pie.)

1 egg.
 Dark brown sugar, 1 cup.
 Milk, 1 cup.
 Flour, 3 tablespoons.
 Fat, 2 tablespoons.

Water, 3 tablespoons.
 Powdered sugar, 1 tablespoon.
 Vanilla, $\frac{1}{2}$ teaspoon.
 1 baked crust.
 Salt, $\frac{1}{4}$ teaspoon.

Put yolk of egg into saucepan; add brown sugar, flour, milk, water, fat, and salt. Stir over fire till mixture thickens and comes to boiling point, but do not boil. Add vanilla. Pour into baked pie shell. Beat white of egg stiff, then beat into it the powdered sugar. Spread meringue on top of pie and brown slightly in moderate oven.

LESSON 4. THE USE OF FAT IN FRYING.

AIM.

To give an idea of the amount and cost of fat required for deep-fat frying and for sautéing; to teach the technic of this method; to suggest methods of obtaining the texture and flavor of fried foods with a smaller expenditure of fat.

POINTS TO BE BROUGHT OUT.

1. "Fried" foods are popular mainly because of their crisp brownness and of the high flavor developed by the intense heat of the fat. Technically speaking, only foods cooked in deep fat are *fried*. Foods cooked in shallow fat are *sautéed*. It is desirable to understand the distinction, although the same idea is frequently expressed in a more roundabout way by the expressions "fried in deep fat," "fried in shallow fat."

2. For the healthy adult a small amount of properly fried or *sautéed* food is perfectly wholesome. Food poorly fried, or too much fried food, even if properly fried, is distinctly hard on the stomach and predisposes to chronic indigestion. Little children should not be given *any* fried food, and school children should have it only sparingly.

3. On a small allowance of fat, people ought not to have much fried food, unless they economize in fat in other dishes. The general effect of frying may be obtained for a good many foods by brushing them with melted fat and browning them in a hot oven.

4. When fat has been reheated frequently it becomes dark and gradually loses its capacity to hold a high degree of heat before scorching. It may be improved by clarifying (see below), but finally becomes unfit for frying and should be used for soap.

5. Special points in deep-fat frying:

A. Mixtures of meat fats can be used for frying. Fat from mutton rendered with milk or beef may be mixed with lard, "compound," or vegetable oil.

B. Fat may be clarified with slices of potatoes or potato and apple as it heats. Small quantities of fat may be clarified by pouring boiling water on *cold* fat, stirring well, and setting aside till a cake of fat forms on top, and then scraping the sediment from the bottom of cake. If this fat is to be kept for several days it should be reheated to drive off the water.

C. Fat should be kept covered while it is heating and cooling unless much moisture must be driven off. The cover keeps in odor and saves fuel in the heating.

D. The temperature of fat for frying may be tested by dropping in a cube of bread and noting the time it takes it to brown. The temperature for a cooked mixture should be sufficient to cook a cube of stale bread golden brown in 40 seconds; for uncooked mixtures, in 60 seconds.

E. The temperature of fat is lowered by putting in the food to be fried. For this reason it may be necessary to reheat the fat a little each time before putting in more food.

F. The excess of fat may be removed from the cooked food by draining the material on any clean absorbent paper.

G. Surplus fat from surface of food may be removed by rapidly plunging food for an instant beneath surface of boiling water in a small kettle set close to the fat kettle. The heat retained in the food quickly dries the surface and leaves the crust as crisp as before the dip, and an amazing amount of fat is thus reclaimed. As soon as a considerable layer of fat forms on the surface of the water it should be skimmed off and set aside to cool. The layer of hardened fat can be recovered. This is a worth-while economy from the point of view of both money and fat conservation. It also makes the food so treated more digestible.

H. The fat should be strained after using to remove burned particles. Double cheesecloth or a coarse muslin is best for this purpose.

6. Points in cooking croquettes:

A. If croquettes and similar mixtures are mixed fairly stiff, brushed with melted fat, and rolled in crumbs, they may be browned in a hot oven and will have much the crispness and flavor of the fried food. Since they can be successfully reheated it is possible to take advantage of the baking or roasting oven to bake a supply of croquettes for some following meal.

B. Croquette mixture may be sautéed in shallow fat, but the pieces will soak up a larger amount of fat than when cooked in deep fat.

C. For deep-fat frying, roll croquettes successively in sifted bread crumbs, egg, and crumbs. The secret of success is to make an unbroken layer over the whole surface. The hot fat cooks the egg and makes a stiff crust that prevents the heated contents from breaking out, and also prevents the absorption of fat. An imperfect layer causes the croquette to break open and absorb fat.

7. Sautéing:

A. Sautéing, often incorrectly calling "frying," is cooking in a small quantity of fat. It is a slower method than "deep frying," less healthful because the food can not be kept from absorbing grease, and more wasteful, on account of the fat taken up in this way. But, as it is sometimes convenient to sauté potatoes, liver, small dry fish, and a few other kinds of food, it is important to know how to do it in the best way.

(1) Directions for sautéing: Have the fat hot enough to hiss when the food is put in. Cook the food first on the one side, then on the other. Use very little fat, adding from time to time just enough to keep the food from burning.

The very worst way of cooking food is to put it into a cold or half-warm pan with grease enough to half cover it, and to let it sizzle and soak until it is wanted. Such food is unfit to eat.

METHOD OF DEVELOPING LABORATORY WORK.

The class may prepare fish balls and some form of croquettes. Half the croquettes should be browned in the oven and the remainder fried in deep fat, and the relative amount of fat used by each method calculated. The flavor produced by each method should be noted.

To economize fat, use one large kettle for deep-fat frying. The fat used may be a mixture of those left from the preceding lessons with the exception of clear mutton fat. If additional fat is needed, the kettle may be filled up with cottonseed oil. Measure the fat before beginning frying and after the cooking is finished to see how much is used, and have the women calculate the cost. If desired, the fat remaining from the frying may be used as the basis of a demonstration of soap making. An additional lesson on this subject might be inserted at this point.

CODFISH BALLS.

Salt codfish, $\frac{1}{2}$ pound.	1 egg.
Potatoes, in inch-thick pieces, 2 heap- ing cups.	Butter, $\frac{1}{2}$ tablespoon.

Boil and mash the potatoes. While they are cooking, cover the codfish with boiling water, and when this is cool enough to allow your hands in it, pick the fish into shreds. Drain off the water, mix fish, potatoes, butter, and egg together, and beat the mixture well. Fry it by heaping tablespoonfuls in deep fat, or shape it into balls or cylinders and fry in deep fat. Shredded codfish may be prepared according to instructions on the boxes.

SAVORY RICE CROQUETTES.

Boiled rice, 2 cups.	Pepper, $\frac{1}{8}$ teaspoon.
1 egg, beaten.	Cayenne or paprika, few grains.
Butter, 2 tablespoons.	Minced parsley, 2 or 3 tablespoons.
Salt, $\frac{1}{2}$ teaspoon.	

Mix the ingredients and shape into croquettes. Roll in crumbs, egg, and crumbs; shape and fry in deep fat hot enough to brown a cube of stale bread in 40 seconds.

These croquettes may be varied by adding a few drops of lemon juice or by stirring in one-fourth to one-half cup of grated cheese.

 LESSON 5. SALADS AND SALAD DRESSINGS.

AIM.

To review the fundamental points in successful salad making, suggest ways of economizing oil, and to illustrate ways of varying the standard salad dressings.

POINTS TO BE BROUGHT OUT.

1. Salads are justly popular from several viewpoints:

A. From the viewpoint of the dietitian because they contain green leaf plants (furnishing minerals and bulk and essential substances) and usually oil (a laxative).

B. From the viewpoint of the cook because they provide a convenient and attractive way of using left overs.

C. From the viewpoint of the menu maker because they contribute more than any other single dish to the contrast in color, flavor, and texture necessary in the satisfying meal.

2. Use salads discriminately. Either plan the salad to fit the meal or build the meal around the salad; *don't* try to toss a salad into a meal regardless of whether the two suit each other.

A. For a hearty meal, choose a light salad, e. g., salad greens and French dressing, or salad greens, an acid fruit, and French dressing.

B. For a light meal, choose a hearty salad with a cooked or mayonnaise dressing. Salads of vegetables, eggs, fish, cheese, or meat, or a combination of these may often serve as the main dish of a light meal; such a salad should never be used as a side dish. A sweet salad with a rich dressing served with crackers will serve as combination salad and dessert course, but would be out of place accompanying the meat course.

3. Classes of foods suitable for salads:

A. Classes of foods suitable for salads are—

- (1) Green salad plants (cultivated and wild).
- (2) Fruits, fresh, dried, and canned.
- (3) Vegetables.
- (4) Cheese.
- (5) Meats.
- (6) Eggs.
- (7) Fish.
- (8) Nuts.

B. A salad should always contain something succulent to crunch between the teeth. This succulence is perhaps its chief charm. Lettuce, celery, cabbage, cubed cucumbers, apples, nasturtium stems and seeds, pickles, nuts, water cress, and the like may be utilized in season to supply succulence.

C. Salad greens should be served crisp. They may be sprinkled, done up in a paper bag or a covered pail, and laid on the ice or in a cool place till ready for use, or they may first be washed and wrapped in a cloth or in a clean paper bag. The latter is preferable, because they are ready for immediate use.

5. Types of salad dressings.—Salad dressings may be of several general types, some very simple:

A. Vinegar or lemon juice with water and sugar.

B. Sweet or sour cream dressings.

C. Oil and salt.

D. Oil dressings without egg; French dressing with its many variations.

E. Oil dressing with eggs; mayonnaise dressing with its many variations.

F. Cooked dressing on the order of an acid custard, thickened partly with egg and partly with flour.

G. Bacon-fat dressing.

6. Salad oils:

A. Olive oil is still generally preferred by some people, though many prefer the more bland flavor of the other salad oils. The recent scarcity and high price of olive oil have caused many people to substitute other less expensive edible oils, such as cottonseed oil and corn oil. Peanut oil is equally palatable but somewhat more difficult to obtain. If the flavor of olive oil is preferred, a small amount of olive oil may be combined with corn, cottonseed, or peanut oil. The desired flavor is obtained, but the cost will be reduced.

NOTE.—See if the class can tell prices and contents of containers of the various salad oils on the market, and estimate the cost per pint or per quart. If this can not be done promptly, assign it as an individual or committee problem for the next lesson.

B. Salad and cooking oils should be kept in a cool, dark place to prevent their turning rancid. The colder they are the thicker they will be and the thicker dressing they will make.

C. When there is a need for economizing in the use of fat, it is desirable not to lessen the amount of salad used, but—

(1) To make the oil go as far as possible where it is used.

(2) To use a larger amount of cooked dressings.

7. Vinegar or other acid draws out the water and wilts the tender tissues of salad greens, hence leaf salads should not be dressed until just before serving. Meats and cooked vegetables, however, are greatly improved by being tossed around in a French dressing (2 or 3 parts of oil to 1 of vinegar) and allowed to stand for a while to season. This process is called “marinating,” and is a real economy because less dressing is needed to give the desired flavor. Mayonnaise dressing should not be added until shortly before serving, as it tends to separate after being mixed with the salad.

8. Make up dressings in quantity to conserve time. A pint or quart is as quickly made as a much smaller amount and may be kept in a cool place for several weeks.

METHOD OF DEVELOPING LABORATORY WORK.

As the salad lesson is a great favorite, it will be worth while to plan some novel yet thoroughly practical features and to enlist the assistance of the class in carrying them out.

1. A committee might be appointed to secure and exhibit a sample of every available salad green in season, such as broad and narrow leaved chicory, French endive, celery, the various varieties of lettuce, white and purple cabbage, Chinese celery, cabbage, water cress, winter cress, blanched dandelion crowns, and other wild greens.

2. The instructor may demonstrate to advantage the making of French dressing in quantity, using a bottle with a glass stopper or a glass preserve jar. (NOTE.—It is desirable to use some olive oil in French dressing if it is not possible to afford olive oil entirely, because the flavor of the oil is more noticeable in French dressing than in mayonnaise.) To show the time saved by mixing in quantity have a member of the class at the same time mix up a small quantity of French dressing, using three tablespoonfuls of oil in a deep saucer. After this small portion is mixed show the effect of adding a small piece of ice and a teaspoonful of ice water. These are generally added to the other ingredients before mixing. The oil thickens as it chills, and the water helps to make a fine emulsion.) If the class is interested in French dressings it may be well to have different members of the class modify portions of the dressing already made according to the recipes below, while one member might make the French dressing suitable for use with fruit salad, by using orange or grapefruit juice in place of vinegar. If the class is more interested in cooked dressings, it will be well to concentrate on them and omit the French dressing.

3. The making of quick mayonnaise dressing (see p. 100) may be demonstrated by the instructor to save time and material. A deep bowl and a small egg whip or a turbine egg beater are the most convenient utensils. Take out a third of the finished dressing and add to it somewhat less than half its volume of hot cornstarch paste (see rule below): to a second part add a third of an egg white, beaten till stiff and dry: leave the remaining third of the dressing plain for purposes of comparison. Explain that where cream is cheap, whipped sweet or sour cream may be stirred in just before serving. Afterwards members of the class may modify the dressing in various ways as indicated below. One member of the class might make a potato mayonnaise, for purposes of comparison.

4. Cooked dressing may be made individually or two or three members may be asked to bring samples of favorite cooked dressings in glass jars, with the recipes plainly written.

5. The salads demonstrated might include:

A. A hearty salad of meat or fish, marinated and served with mayonnaise dressing. "Mock chicken" salad, made of celery and veal or lean pork (loin is especially good); or salmon or tuna fish mixed with an equal volume of cold boiled rice (cooked dry), with celery or cubed cucumbers.

B. One or two kinds of salad greens dressed with some modification of French dressing.

C. A fruit salad with French or boiled dressing. It is desirable to have the material for these salads prepared by a committee of three or four women, either at their own homes or before the class assembles so that the salads are all ready to be put together.

D. Salads from left-over vegetables.

FRENCH DRESSING IN QUANTITY.

Olive oil, 1 cup.

Vinegar, $\frac{1}{4}$ to $\frac{1}{2}$ cup.

Salt, $1\frac{1}{2}$ teaspoon.

Dash cayenne pepper.

Mustard, 1 teaspoon, if desired.

Paprika, 1 teaspoon, if desired.

Powdered sugar, $\frac{1}{2}$ teaspoon, if desired

Place a small funnel in the neck of a good-sized glass bottle, preferably one with a ground-glass stopper. Add first the dry ingredients, next the vinegar, and finally the oil. Remove the funnel, cork the bottle, and shake vigorously until the dressing is well thickened. Pour off what is wanted, recork the bottle, and set away in a cold place. Shake well each time before using. A glass preserve jar may be used.

VARIATIONS.

1. For fruit salads omit mustard, use sugar, and substitute lemon, orange, or grapefruit juice for vinegar.

2. Vinaigrette dressing (for green salads).—To $\frac{1}{2}$ cup French dressing add 1 teaspoonful each finely chopped parsley and capers and 1 teaspoonful of grated onion, additional salt, and pepper or tobasco sauce. The yolk of a hard-cooked egg may be added, in which case use 2 tablespoonfuls less oil, and 1 tablespoonful more vinegar.

3. Roquefort dressing.—To $\frac{1}{4}$ cup of French dressing add 1 teaspoonful finely crumbled Roquefort cheese, and season more highly with salt and vinegar, if desired.

SOUR CREAM DRESSING.

Thick sour cream (not old enough to be bitter), 1 cup.

Vinegar, 3 tablespoons, or juice $\frac{1}{2}$ lemon, and 2 teaspoons vinegar.

Sugar, 1 teaspoon.

Dash of cayenne pepper, or $\frac{1}{4}$ teaspoon paprika.

Salt, 1 teaspoon.

SWEET CREAM DRESSING.

Heavy cream, $\frac{1}{2}$ cup.

Vinegar, 3 tablespoons.

Cayenne pepper, or $\frac{1}{4}$ teaspoon paprika.

Salt, $\frac{1}{4}$ teaspoon.

Beat cream with Dover beater until stiff; add seasonings. Add vinegar slowly, continuing to beat.

QUICK MAYONNAISE DRESSING.

Oil, 1 cup.	Powdered sugar, $\frac{2}{3}$ teaspoon, if desired.
Yolk of 1 egg.	
Vinegar, 2 tablespoons, or lemon juice.	Mustard, $\frac{2}{3}$ teaspoon.
Few grains cayenne.	Salt, $\frac{2}{3}$ teaspoon.

If onion flavor is desired, rub the bowl with a freshly cut onion or a clove of garlic. Put in the seasonings, mix well, mix them with the entire amount of acid, then add the yolk, and beat well. Now add the oil, at first by tablespoonfuls, beating after each addition. Presently the oil may be added in larger quantities. When all has been used, add any further necessary seasonings and beat thoroughly. Cover the bowl with an earthen dish and keep in a cool place until it is needed.

By adding the acid before the oil the egg is partially curdled or thickened, and the oil may be added more rapidly than by the other method.

CORNSTARCH-PASTE BINDING FOR MAYONNAISE DRESSING.

Mayonnaise may be prevented from separating, and the quantity may be increased without materially altering the flavor by stirring into it after it is mixed about $\frac{1}{3}$ of its bulk of hot cornstarch paste, made in the following proportions:

2 tablespoons cornstarch.	$\frac{1}{4}$ cup vinegar.
$\frac{3}{4}$ cup boiling water.	

Mix the two tablespoons cornstarch smoothly with the $\frac{1}{4}$ cup vinegar in an enamel saucepan; add $\frac{3}{4}$ cup boiling water, and simmer gently five minutes. Cool very slightly and beat the desired quantity into the mayonnaise, which will become thicker and lighter in color. Chill the mass before using.

This starch paste binding is particularly desirable to use when cotton-seed, corn, or peanut oil is being used in place of olive oil.

VARIATIONS OF MAYONNAISE DRESSINGS.

1. Softened butter or thick, slightly soured cream may be used in place of part of the oil.

2. Mayonnaise piquante, for meat, fish, or shellfish salads.—To 1 cupful of mayonnaise add 2 tablespoonfuls each olives and pickles finely chopped.

3. Mayonnaise tartare or sauce tartare: For fish and shellfish salads, and for fried fish, scallops, and soft-shell crabs. Same as mayonnaise piquante, plus onion juice or finely chopped Spanish onion.

POTATO MAYONNAISE.

The inside of a small baked potato may be used in place of egg yolk. Remove and mash it and add—

Mustard, 1 teaspoon.	Vinegar, 1 tablespoon.
Salt, 1 teaspoon.	Powdered sugar, 1 teaspoon, if desired.
Dash of cayenne pepper.	

Force the mixture through a fine sieve. Add 1 tablespoonful vinegar and $\frac{3}{4}$ cup oil by tablespoonfuls, as in standard mayonnaise.

COOKED DRESSING I.

Milk, $1\frac{1}{2}$ cups.

2 eggs, slightly beaten.

Sugar, 4 tablespoons.

Mustard, $2\frac{1}{2}$ teaspoons.Vinegar, $\frac{1}{2}$ cup.

Melted butter, 3 tablespoons.

Flour, $1\frac{1}{2}$ tablespoons.

Salt, 2 teaspoons.

Cayenne pepper.

Mix the ingredients and blend with them $\frac{1}{4}$ cupful of milk. Heat the remainder of the milk to boiling, add the butter, thicken with the first mixture, and boil for two minutes. Cool slightly, add the vinegar gradually, and pour this hot liquid cautiously over the slightly beaten egg, stirring constantly. Cook the whole over hot water until it thickens. Cool immediately in order to prevent curdling and pour into a scalded glass jar. This rule makes more than a pint of rather mild dressing, which will keep for a long time in a cold place. No whipped cream need be added to this dressing.

COOKED DRESSING II.

Yolks, 3 eggs.

Sugar, $\frac{1}{3}$ cup.

Mustard, 1 teaspoon.

Whipped cream.

Paprika, $\frac{1}{4}$ teaspoon.Salt, $\frac{1}{2}$ teaspoon.

Vinegar, 1 cup.

Beat eggs slightly and add to them the other ingredients in the order given. Cook the mixture in a double boiler, stirring it constantly until it is smooth and thick. This dressing will keep a long time in a cold place. When ready to use, mix with equal parts of whipped cream.

A mild dressing suitable for fruit salad may be made by using 1 cup of juice from canned pineapple and the juice of 1 lemon in place of the vinegar. Omit the mustard.

BACON DRESSING.

For dandelion, cabbage, and other green salads.

Use the fat left from cooking bacon. Warm the fat, and if there is much sediment, strain it through fine cheesecloth. Use 2 parts of fat to 1 part of vinegar, thicken slightly with flour and water well blended, and cook for a few minutes to remove the raw taste of the flour. This dressing is usually served hot. It is good salad dressing for camp where much bacon is generally used.

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UNIT VI.

Meat, Fish, Poultry, and Game.

GENERAL INFORMATION.

1. The problem of a sufficient meat supply in the United States is only partly the result of war conditions. For some years there has been a steady shrinkage in the number of cattle in this country and a steady rise in the price of meat, due to the decrease of large areas of grazing land and the increased cost of producing meat animals.

2. War conditions affected the meat situation because of—

A. The need for larger amounts of meat than were used in times of peace. The soldier uses a much larger amount of meat than the civilian engaged in ordinary occupations. The English soldier is allowed a weekly ration of 7 pounds of meat and $1\frac{3}{4}$ pounds of bacon. The Italian soldier is allowed 4 pounds. The American is given 20 ounces of fresh beef or bacon, or 10 ounces of canned meat a day. This makes his yearly consumption nearly 400 pounds as compared with the 175 pounds consumed by the average civilian. This need will continue as long as it is necessary to keep the army of occupation abroad.

B. The limiting of imports because of reduced tonnage available for this trade.

C. Lack of grain and fodder for feeding animals.—The great shortage of grain in Europe and the drain upon the supply for food for human beings have caused the slaughter of large numbers of cattle. The cattle that remain are greatly reduced in weight and offer diminished resources.

D. Seizure of cattle by Germany.—In Belgium more than three-fourths of the cattle are gone. One-fifth of the cattle of France are estimated to have been thus lost during the period of invasion.

3. America as a source of supply.—Australia, South America, and the United States are the three principal sources of a meat supply at the present time. Since the shipping distance from this country to Europe is much less than that from South America or Australia, we have come to be one of the chief sources of meat supplies for European nations. This has been accomplished through:

A. Increased production.

B. Increased slaughter and shipment of meat. In October, 1918, 130,000,000 pounds of pork were shipped as compared to 52,000,000 pounds in October, 1917. Beef shipments have increased in pro-

portions. One month of 1918 showed the exports of beef and pork together to be 83 per cent greater than in the same month of 1914.

C. Conservation in the consumption.—Since it takes a comparatively long time for animals to grow to maturity, it has been impossible to increase our production to meet the demands. Only through the voluntary conservation of the individual himself has it been possible to increase the imports without depleting our own herds to a dangerous degree.

4. Shortage of meat does not end with the war.—It will take years for the nations of Europe to replace their herds and restock their farms. The shortage of meat is a condition that must be faced for many months. If America is to do her share in supplying food to the world, and in helping to restock the herds that have been depleted, conservation of meat and meat products and more extensive use of meat substitutes and meat savers should become a national habit in America.

5. Meat substitutes and meat savers.—Because of occasional temporary variations in the meat supply and from the standpoint of economy there will always be need for the housekeeper to know how to conserve in the use of all meats.

LESSON 1. THE SELECTION OF MEAT.

AIM.

To teach the proper use of meat in the diet and the rules governing its selection.

POINTS TO BE BROUGHT OUT.

1. Average composition of edible portions of meat:

A. *Protein*, 12 to 20 per cent.

B. *Fat*, 10 to 49 per cent.

C. *Water*, 40 to 70 per cent, in reverse proportion to the fat.

D. *Mineral*, 0.5 to 1.5 per cent.

2. Place in the diet:

A. As a tissue-building food.—In this respect meat seems to have no advantage over any other protein-rich food, with the possible exception of the legumes.

B. Source of energy in the diet.—Meat is an uneconomical food from this standpoint, since it represents such a small proportion of the food which the animal has eaten. Considerably less than 10 per cent of the energy of the grain eaten is turned into meat or fat.

C. Furnishes flavor in the diet.—On this account there is a tendency to use more than is desirable. Protein is not burned completely in the body, but leaves a residue which is eliminated by the

kidneys. Too much protein-rich food in the diet throws extra work on the kidneys.

3. Price of meat is determined by:

A. Tenderness.—Because the tender cuts can be cooked without losing the flavor, they are the most expensive.

B. A marbling of fat in the lean helps in the retention of flavor in cooking but increases the cost of the meat out of proportion to the increase in food value.

C. The local demand for a cut may operate to influence its cost. This tends to make the cost of cuts more nearly the same in spite of differences in the characteristics noted above. For example, in a town in which the demand is chiefly for round steaks and there is little demand for the more expensive cuts, round and the sirloin portion of the loin are frequently quoted at the same price, in spite of the fact that the sirloin is more tender and has a better distribution of fat.

4. In buying meat the housewife should keep in mind:

A. The form of meat most available in her community. This may vary with national and local conditions.

B. The characteristics and appearance, also location of the different cuts. (See Tables I, II, III.)

C. The proportion of edible meat in the different cuts. (See Table IV.)

D. The way in which the meat is to be cooked.—It is very foolish to buy an expensive cut of meat and cook it by a method that is adapted to a cheaper cut.

E. Is the meat killed locally or is it a packing house product? In the case of local meat, be sure it has been inspected. The Government inspection of meat has only to do with such meat as enters interstate commerce. The inspection of meat killed by firms selling only locally must be enforced by local laws.

F. The tenderness of the meat is increased by hanging for several days at a temperature just above freezing. Where the meat is killed locally and refrigeration facilities are not available, there is a tendency to use the meat too soon after killing, and as a result it is tough. The housewives should insist upon having the meat held sufficiently long to become tender before being sold.

METHOD OF DEVELOPING LABORATORY WORK.

If possible, have a demonstration of the different cuts of meat given by a local butcher, calling attention to the characteristics which will enable the women to distinguish the cuts in buying. Have cuts from the different animals shown, but lay the most stress on the cuts that are used by the group of women present. Have women work out

from the data given in the table the cost per pound of the edible meat in the different cuts.

TABLE I.—*Showing location, characteristics, and uses of the cuts of beef and veal.*¹

Cut.	Location.	Characteristics.	Uses.
Steak.....	Hind leg to knee joint.....	Tough; large percentage of bone.	Soups.
Round.....	Hind leg from knee to hip joint.	Muscles vary in toughness; average, medium tough; low in per cent of bone.	Pot roast, Swiss steak, Hamburger, or steak with long, slow cooking; stews, beef juice.
Rump.....	Around the pelvic bone....	Medium tough; high in bone.	Roasts or pot roasts, depending upon toughness of animal.
Loin—porterhouse, sirloin.	From hip joint and pelvic bone to and including last rib; division depends upon market demand.	Most tender—upper end (porterhouse) more tender than the lower end (sirloin).	The best steaks.
Flank.....	Lower end of loin.....	Tough.....	Stews and pot roasts.
Rib.....	From sixth to twelfth rib inclusive, counting from head.	Tender.....	Roasts.
Plate, navel end....	Lower end of rib cut.....	Medium tough; contains rib bones.	Stews.
Brisket end.....	Lower end of chuck.....	More tough.....	Corned beef, pot roasts, stews.
Shin.....	Front leg to knee.....	Tough, large percentage of bone.	Soups.
Chuck.....	First five ribs from head of animal.	Medium tough, depending upon part.	Roasts, pot roasts, stews, steaks.
Neck.....	Neck trimmings.....	Tough.....	Stews, mincemeat.

¹ This and the following tables have been compiled by Louise Stanley from data obtained from the Department of Agricultural Chemistry, University of Missouri.

TABLE II.—*Showing characteristics and uses of cuts of pork.*

Cut.	Characteristics.	Uses.
Ham.....	Tender, medium fat.....	Usually cured, may be used fresh for chops, steaks, or roasts.
Bacon.....	Very fat with only streaks of lean; the spare rib and leaf fat are removed from underneath.	Cured, spare ribs are used as pot roasts, leaf fat is made into lard.
Loin back.....	Contains bones of back and may have some of rib bones; tender.	Chops and roasts.
Shoulder.....	Fairly tender; medium fat; more bone than in ham.	Cured or used fresh for roasts and chops.
Jowls.....	Fat, tender.....	Cured as jowls or flattened and trimmed as Dixie squares.
Feet.....	Largely bone.....	Pickled or used fresh.

TABLE III.—*Showing characteristics and uses of cuts of mutton and lamb.*

Cut.	Characteristics.	Uses.
Leg.....	Tender.....	Roasts or steaks.
Loin.....	do.....	Do.
Back or rib.....	do.....	Chops or crown roast.
Shoulder.....	More tough and larger amount of bone..	If shoulder bone is left in, roast slowly; if bone is removed, pot roast.
Plate.....	More tough and fat.....	Stew.
Fore leg.....	More tough.....	If large enough, pot roast; otherwise, stew.
Neck.....	Tough.....	Stews.

TABLE IV.—*Showing cost of edible lean in different cuts of beef.*

Cut.	Price per pound.	Lean meat.	Fat.	Bone.	Cost of edible lean meat.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	
Hind quarter.....		61.41	22.80	15.43	
Tail.....		37.75	4.90	54.41	
Head.....		21.75	6.59	71.66	
Shank.....		32.82	6.63	60.16	
Round.....		74.33	14.17	10.82	
Rump.....		51.91	22.59	25.46	
Loin.....		62.26	23.91	13.34	
Flank.....		48.65	59.01	.92	
Fore quarter.....		63.29	17.01	25.46	
Rib.....		61.94	12.97	25.53	
Chuck.....		71.77	10.58	17.17	
Neck.....		62.41	9.94	28.25	
Shin.....		49.41	9.22	41.05	
Plate.....		57.09	24.60	18.07	

Two blank columns as indicated above are to be filled in by the teacher.

EXAMPLE.—If rib is 30 cents a pound and only 64.94 per cent of it is lean the actual cost of the edible lean meat is $\frac{30}{0.6494} \times 100 = 46$ cents per pound.

LESSON 2. ROASTS AND STEAKS.

AIM.

To give the housewife a knowledge of the food value and structure of the meat and the points involved in cooking tender cuts.

POINTS TO BE BROUGHT OUT.

1. Composition and cost:

A. Meat must be selected with care and used wisely and completely.

B. Meat contains *protein, fat, mineral matter*, one of the undetermined "dietary essentials," and flavoring substances. The constituents may be obtained equally well from other sources, but people are willing to pay the price demanded for meat on account of its flavor.

C. The flavor of meat may be developed by cooking. The flavor is due to extractives which are soluble and are removed when the meat is cooked in water; hence it is best developed by a method of cooking in dry heat, without water or steam. The crust formed by dry heat also prevents the escape of the flavor and juices. Only tender cuts of meat can be cooked in this way, as dry heat increases the toughness of tough cuts. Since they may be cooked so as to retain the flavor, the tender cuts are more expensive. Their food value is no higher than that of the tougher cuts and may sometimes be lower.

2. Structure.—Meat is made up of muscle fibers which contain muscle juices and which are held together by connective tissue.

Heavy cell walls and large amounts of connective tissue make meat tough. The fat of meat is largely found in the connective tissues. Beef fat is mainly in distinct layers, while in pork the fat is in minute layers surrounding the individual muscle cells.

3. Methods of cooking meat.—Methods of cooking meat may be grouped under three heads:

A. Methods for cooking tender cuts, adding no water: Broiling, roasting, frying, and sautéing.

Aim.—To retain and develop flavor and change the color.

Essential points.—The use of dry heat and no water.

B. Methods for cooking tough cuts without much bone: Pot roasting, stewing, cooking as Swiss steak, etc.

Aim.—To develop and retain as much flavor as possible but at the same time to cook for tenderness.

Essential points.—Use liquid and long, slow cooking to make tender. Develop and retain flavor by browning first and starting in hot water; use well-seasoned gravy. Further flavor may be developed by browning at the last.

C. Methods for cooking tough cuts with much bone: Soups and broths.

Aim.—To extract all the flavor.

Essential points.—Divide finely. Start in cold water; use long, slow cooking.

4. Principles involved in cooking tender cuts:

A. Expose the meat at first to intense heat to sear the outside and keep in the flavor and juices.

B. Reduce the heat so as to cook through to the color desired.

C. Determine when done by—

(1) Time of cooking.—This is not a certain method since it varies with the size, shape, and structure of the piece.

(2) Use of thermometer.—The temperature is a measure of the color change of the juices.

Temperature.	Condition.	Color.
60° C. (140° F.).....	Rare.....	Pink.
70° C. (158° F.).....	Medium.....	Gray-pink.
80° C. (176° F.).....	Well done.....	Gray-brown.

D. Baste only with fat, since water dissolves the outside coat and will release juice and flavor. Do not cover since the steam condenses on the lid and drips back as water, thus dissolving the outside coat of the meat. If meat is placed in the pan with the fat side up the fat fries out slowly and bastes the meat.

METHOD OF DEVELOPING LABORATORY WORK.

The women should prepare beef juice according to the directions below to determine the characteristics of the muscle juice and to show the structure, composition, and color changes of meat. Have roasts brought to class and prepared there. They may then be taken home and served or may be sold. If possible, have cuts of different shapes and calculate the time required per pound for cooking. Note any differences and discuss reasons for such differences. If it seems advisable, steaks or chops may be broiled.

All the meat bought should be used. Trimmings of meat and bone may be used for soup and any excess fat rendered. A certain proportion of fat is desirable in cooking meat, but this should not be wasted. The fat left in the pan after cooking a roast should be saved and used for preparing gravies and seasoning vegetables or soups. It has the meat flavor so desirable for this purpose. Take all necessary precautions to prevent the fat from burning in the pan, and be sure all the fat and flavoring material are saved. This precaution should be taken at the end of each lesson in this unit. For methods of using this fat see Unit V.

MAKING BEEF JUICE.

Round steak is preferred for making beef juice, since it contains so little tissue fat. Scrape it with the dull edge of a knife so as to separate the muscle fibers from the connective tissue as completely as possible. Make the muscle fiber into a small cake and broil slightly on either side to start the juices. Press out the juice, using a potato ricer. Examine the juice carefully; heat a small portion in a test tube and note the coagulation. The portion coagulating is the protein of the muscle juice. When it is removed there remains only the soluble mineral constituents, food accessory substance, and flavoring constituents of the meat.

Discuss the usual method of preparing beef juice by placing chopped meat in a jar and heating in a water bath. A juice of lower food value is obtained in this way, since some of the soluble protein is likely to be coagulated and removed when the juice is strained. Since beef juice is given to invalids who need nourishing food, it is important that it should be prepared so as to retain as much food value as possible. Calculate the cost of the beef juice and discuss other foods which might be used instead.

Examine the connective tissue and the muscle fibers from which the juice has been extracted. Both of these are largely protein and water. They contain a mixture of proteins. Most of the protein of the fiber hardens or coagulates on heating, but the connective tissue

protein is changed by the moist heat to gelatin. This is the reason why tough meat tends to fall apart in fibers when cooked in water while the protein in this fiber is hardened by the heat.

LESSON 3. POT ROASTS AND STEWS; LESS USED PORTIONS.

AIM.

To teach the best method of preparing tough cuts of meat; also the use of the offal portions and some ways of preparing them palatably.

POINTS TO BE BROUGHT OUT.

1. Methods of cooking tough cuts:

A. Tough cuts of meat having the same proportion of edible meat are as high in food value as the more expensive tender cuts.

B. More care is necessary in preparation in order to retain and develop as much flavor as possible while cooking for tenderness.

C. In preparation they may be made more tender by—

(1) Long, slow cooking at low temperature. (Fireless cooker is good for this purpose.)

(2) Cooking in moist heat.

D. Flavor may be developed and retained by—

(1) Browning before cooking so as to coagulate the outside and help retain the juices.

E. Flavor may be increased by—

(1) Browning after cooking to tenderness.

(2) Use of well-flavored sauces.

(3) Added seasoning.

2. Use of so-called offal portions.—The offal portions most commonly used as food are:

A. Nervous tissue—brain.

B. Glandular tissues—

(1) Liver.

(2) Thymus—sweetbread.

(3) Pancreas (sometimes called the stomach sweetbread).

(4) Kidney.

C. Muscular tissue—

(1) Heart.

(2) Feet.

(3) Tongue.

These should be used by the housewife, because—

(a) They accumulate as by-products in the packing industry.

(b) They can not be shipped well, so should be used locally to release other foods for shipping.

(c) They furnish just as good food as the usual cuts of meat. The glandular tissues yield a large proportion of uric acid; therefore should be avoided by people suffering from difficulties which result from an accumulation of uric acid.

(d) They are frequently cheaper than other cuts of meat.

The price depends upon the local demand.

3. Comparative food value:

Description.	Water.	Protein.	Fat.	Ash.	Calories per pound.
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	
Brains.....	78.2	10.2	9.8	1.3	586
Liver.....	72.2	19.4	4.1	1.0	531
Sweetbread.....	70.9	16.8	12.1	1.6	800
Kidney.....	73.8	15.6	4.0	1.2	455
Pigs' feet.....	68.2	16.3	4.5	.9	900

4. Method of cooking depends upon compactness and toughness of the tissues in question.

A. Tender portions:

(1) Brains.

(2) Sweetbread.

(3) Liver from young animal.

These are cooked just enough to develop flavor. The usual method is to parboil so as to make firm and prevent spoiling. They can then be sliced and broiled or creamed.

B. Tough portions:

(1) Liver from the older animals can be prepared very palatably by parboiling, then treating as other liver.

(2) Heart should be prepared by long slow cooking in moist heat. Parboil and bake, pot roast, or stew.

(3) Pigs' feet are made up largely of muscle and bone. The bony portions are chiefly joints, the cartilage of which can be gelatinized by long slow cooking. Cook until tender and gelatinized, then brown with or without batter to develop flavor.

METHOD OF DEVELOPING LABORATORY WORK.

Demonstrate or have the women prepare some of the dishes listed below. These are all dishes that can be started and carried home for the use of the family, so it is suggested that materials be furnished the women at cost or that they bring in the materials and carry the prepared dishes home. The women should be asked to report upon at least two other dishes prepared at home.

Some of the dishes should be prepared as a demonstration so that the women may sample the results. In assigning the lesson discuss with the women the best cuts for the different dishes, basing the discussion on the table in Lesson 1.

POT ROAST.

Brown the roast in a little fat to sear and to develop flavor. Place in a pot or casserole with a closely fitting cover. Add 1 cup water and cook until tender (two to three hours), adding more water if necessary. The roast may be cooked either on top of the stove or in the oven. Vegetables, such as carrots, turnips, or onions, may be added at the beginning of the cooking; tomato juice may be used for the liquid added and potatoes may be added about 30 minutes before the roast is done.

BREADED VEAL.

Cut into pieces of a suitable size for serving. Roll in egg and crumbs and brown quickly in a small amount of fat. Add 2 cups of hot water or stock; cover and simmer until the veal is tender (about 45 minutes).

BRAINS SCRAMBLED WITH EGG.

Soak calves' brains 1 hour in cold water. Remove the membrane and par-boil 20 minutes in salted water to which a little vinegar or lemon juice has been added. Drain, separate into small pieces. To 4 eggs, lightly beaten, add 4 tablespoons of milk or water, salt, pepper, and $\frac{1}{2}$ cup of the brains, and scramble in a small amount of butter substitute. Serve with chopped parsley.

CREAMED SWEETBREADS.

Cook sweetbreads as directed above for calves' brains. Dice in $\frac{1}{2}$ -inch cubes and heat in a cream sauce made from 1 tablespoon butter substitute, $1\frac{1}{2}$ tablespoons flour, and 1 cup milk. Season with salt and pepper.

MINCED KIDNEY.

Trim kidneys, removing white fat from center. Cut in thin slices, dredge with flour, and brown in a small amount of fat, to which has been added a sliced onion. Other seasonings, such as green pepper and celery salt, may be added. When brown add 1 pint of water or stock. Simmer gently for five minutes. Add more flour if necessary to thicken the gravy. Serve on toast or with mashed potatoes. Kidneys should be cooked only a short time or they become toughened.

FRIED LIVER.

Veal liver is preferable because of its tenderness, but beef liver may be used by first boiling until tender. After boiling cut in half-inch slices; remove the outside skin and veins; dredge with corn meal and fry in hot fat.

PIGS' FEET IN BATTER.

Use fresh, well-cleaned pigs' feet, which have been split down the center. Bring to a boil in water enough to cover and cook four to five hours in the

fireless cooker, with a well-heated stone, or simmer gently over a fire. When they are thoroughly softened dip in a batter made from 1 cup flour, 1 cup of milk, 1 egg, 1 teaspoon baking powder, and 1 teaspoon salt, and brown in hot fat.

BEEF HEART.

Cut in slices one-half inch thick, soak in salt water one hour, roll in corn meal, brown on both sides in hot fat. Add water, cover pan, and cook slowly until tender. Serve with brown gravy thickened with flour.

LESSON 4. METHODS OF EXTENDING MEAT FLAVORS.

AIM.

To teach methods of preparing meats, with the addition of dressings, cereal mixtures, and vegetables so as to extend the flavor and make the meat go further.

POINTS TO BE BROUGHT OUT.

1. People like the flavor of meat, so if this flavor can be extended through cheaper vegetable foods less meat and more of the other food is eaten.

2. The cheaper cuts should be used when the flavor is to be extended, because it is uneconomical to use tender cuts when the flavor can not be retained in the meat itself.

3. Suggested ways of extending flavor:

A. Use of dressing to extend flavor, as in stuffed fowl or mock duck. This has two advantages—

(1) Makes meat go further.

(2) The moistness and flavor added to the dressing helps to flavor the meat and keep it moist in cooking.

In making dressing fat should be added, as well as liquid, so that the dressing will not become too pasty.

B. Use of dumplings.—When added to meat stews they thicken the stew and take up the flavor of the meat.

C. Cooking with added cereals, as in rice and chicken, or the service of rice with meat gravy as is customary in the South.

D. Cooking meat with added vegetables, as in case of stews and braised vegetables. In this case the vegetables help season the meat as well as the meat the vegetables.

METHOD OF DEVELOPING LABORATORY WORK.

Have dishes of each type prepared, if possible, for family service, and have the women take them home for use. Have other dishes

tried at home and reported upon. Calculate the cost of one serving of one of these dishes compared with an equivalent serving of all meat. If there is time, the soup for next lesson should be started at this time. (See Lesson 5.)

MOCK DUCK.

On a round steak, place a stuffing made as below, and roll the steak up around the stuffing, fastening with wooden toothpicks or tying with a string. Brown the outside quickly to develop flavor. Add a cup of hot water, meat stock, or tomato juice, and cover. Cook slowly until tender.

STUFFING FOR MOCK DUCK.

Corn-bread crumbs, 2 cups.	Fat, $\frac{1}{4}$ cup.
Bread crumbs, 1 cup.	Milk, or water, or stock to soften ($\frac{1}{2}$ to 1 cup).
1 onion (minced).	
Chopped parsley, 1 tablespoon.	

HOT POT OF MUTTON AND BARLEY.

Mutton, 1 pound.	4 potatoes.
Pearled barley, $\frac{1}{2}$ cup.	3 onions.
Celery tops or parsley.	Salt, 1 tablespoon.

Cut the mutton in small pieces and brown with the onion in fat cut from the meat. Pour this into a covered saucepan. Add 2 quarts of water and the barley. Simmer for $1\frac{1}{2}$ hours. Then add the potatoes, cut in quarters, and the seasonings, and cook one-half hour longer.

SAVORY STEW.

Meat, 1 pound.	Parsley or soup herbs.
Fat from the meat, 2 tablespoons.	Any two or more vegetables. The following are suggested: Onion, carrot, green peas, turnips, or cabbage.
4 medium potatoes or one cup of barley, rice, or hominy grits, or both potato and cereal.	Salt, 1 teaspoon.

Cut the meat in small pieces and brown it in the fat. Add the cereal, the seasonings, and $1\frac{1}{2}$ quarts of water. Simmer until the cereal is nearly done; then add the vegetables and continue cooking till they are tender, adding more water if needed. This stew may be made into a savory meat pie by omitting the potato in it and instead lining a baking dish with mashed potato, pouring in the stew, covering it with mashed potato, and browning in the oven.

LESSON 5. SOUPS AND BROTHS; LEFT-OVER MEATS.

AIM.

To teach how to extract the flavor from meat in making soup: The food value of meat soups and their place in the diet, and ways of using the meat from which the flavor has been extracted.

POINTS TO BE BROUGHT OUT.

1. Food value and place in the diet.—Meat soups and beef broths contain only the soluble flavoring constituents of the meat and gelatin, which is the one soluble protein present to any extent in meat that is not coagulated on boiling. Since most of the protein is removed from meat soups on boiling and straining, they contain only soluble mineral constituents and flavoring material and any floating fat, and are consequently not high in food value. Their value in the diet is as a source of flavor and as a stimulant to digestion rather than as a means of nourishment.

2. Choice of cut for making soups and broths.—In selecting meat for soups the tough cuts, containing bone, lean, and connective tissue, with little fat, are used, since they are usually equally well flavored and are less costly. Cuts containing the joint portions of the bones, especially those from young animals, are desirable for soup making, since they yield a large amount of gelatin.

3. Method of cooking for soups and broths.—The aim in making soup is to extract as large a proportion of the flavor and gelatin as possible. In order to do this—

A. Sear a portion of the meat to develop the flavor of the soup.

B. Start cooking in cold water so that the outside will not become coagulated and the soluble constituents held in.

4. After cooking, the meat should be set aside to cool so that the fat can be removed. It can usually be lifted off in a solid cake. If the fat does not solidify, a piece of ice in a cloth run over the top will aid in its removal. Fat left on the top of soup is not only wasteful but dietetically undesirable.

5. Ways of clearing soups.—Soups may be partially cleared by straining. If complete clearness is desired, it is necessary to collect the fine, suspended particles of coagulated protein by adding to the cold soup a soluble protein which will coagulate in masses and entangle the finer particles. (The principle is the same as clearing coffee with an egg.) Egg white is most frequently used for this purpose. The egg white contributes in no way to the food value of the soup, but is itself wasted. The food value of the soup is also decreased by the removal of the floating particles of protein. The demand for a clear soup is purely an aesthetic standard which should break down before the standards of conservation and economy.

C. Divide the meat and bone as finely as possible so that the soluble constituents are more easily extracted.

6. Uses of the left-over meat:

A. The large part of the food value of the meat is left in the solid portion from which the flavor has been extracted. It is therefore important that this meat should be utilized.

B. In making the meat left over from soups and broths palatable, it is desirable that flavor be added.

C. The following ways of using soup meats are suggested:

(1) Croquettes—

(a) Grind the meat and add a binder and seasoning; mold, dip in egg and crumbs, and fry or bake.

(b) Binder may be any thick, starchy mixture, such as cooked left-over cereal, potato, or thick white sauce (four tablespoons flour to one cup of milk). The resulting mixture should be thick enough to mold when cold but thin enough to be moist when hot. The proportion should be 1 part binder to 2 or 3 parts meat.

(c) Season to taste. Salt, pepper, ground parsley, celery, lemon juice, and onion are suggested. Since much of the flavor of the meat has been extracted, generous seasoning is desirable.

(d) Dip in egg (dilute each egg with two tablespoons of milk or water), because it cooks quickly over the outside and makes it possible for the croquette to retain its shape. This is especially necessary if the croquettes are to be fried since the coating of egg coagulates quickly and prevents the fat from soaking into the inside of the croquette.

(e) Baking the croquette.—In order to save fat and time it is suggested that the croquettes be baked rather than fried. Form as usual, roll in egg and crumbs, and place in a hot oven to brown.

(2) Escalloped.—Prepare as for croquettes but do not mold. Place in a baking dish, cover the top with buttered crumbs, and brown in the oven.

(3) Baked hash.

(4) Tamale.

(5) Stuffed peppers.

METHOD OF DEVELOPING LABORATORY WORK.

The method of starting soup should be taken up during the preceding lesson, if the lessons come with sufficient frequency, and the soup may be started and continued cooking between times so as to be ready. If this can not be done, have the soup prepared by one of the women who lives near by and brought to the class. Encourage all to repeat the process at home.

Demonstrate or have the women prepare the meat in one of the ways suggested. Have other ways tried at home and the results brought to the class for discussion.

BAKED HASH.

To chopped, seasoned meat add one-third the quantity of mashed or diced potatoes and a chopped onion. Add gravy stock or hot water until the mixture is soft enough to mold. Form into a loaf or place in a baking dish and bake until brown.

TAMALE.

- Corn meal, 2 cups.

Water, 6 cups.

Fat, 1 tablespoon.
- 1 onion.

Tomatoes, 2 cups.

Chopped meat, 1 pound.

Salt and pepper.

Make a mush of the corn meal, water, and 1½ teaspoons salt, and cook 45 minutes. Brown the onion in the fat, add the meat, salt, pepper, and tomato. Grease a baking dish, put in a layer of cornmeal mush, add seasoned meat, cover with mush, and bake half an hour.

STUFFED PEPPERS.

Remove the tops and the seeds from green sweet peppers. Stuff with a croquette mixture, or with equal parts of chopped cooked meat and mashed potatoes, or cooked cereal, seasoned well. Put into a baking dish, add ½ cup of water and bake until the peppers are tender.

LESSON 6. THE USE AND PREPARATION OF FISH AND OTHER SEA FOODS.

AIM.

To teach the economical use in the diet of fish and other sea foods and the principles underlying their preparation.

POINTS TO BE BROUGHT OUT.

1. Composition:

A. The per cent of *protein* shows about the same variation as in the different forms of meat. Variations are from 13 to 20 per cent, or about 6 per cent of the edible portion.

B. *Fat* shows wide variations—from 0.2 to 20 per cent. Fish are usually grouped on the basis of the fat content into three groups. The first has less than 3 per cent fat; the second, 3 to 5 per cent; and the third, more than 5 per cent.

Less than 3 per cent fat.	3 per cent to 5 per cent fat.	More than 5 per cent fat.
Bass. Blackfish. Cod. Flounder. Haddock. Perch. Smelt. Sturgeon. Brook trout. Carp. Burbot.	Striped bass. Buffalo. Muskellunge. White perch. Sheepshead. Weakfish.	Butter fish. Catfish. Eels. Halibut. Herring. Mackerel. Salmon. Shad. Spanish mackerel. Salmon or lake trout. Turbot. Whitefish. Sablefish. Eulachon.

C. Edible portion varies in different fish from 20 to 60 per cent. Keep account of this in the fish bought for laboratory use and have the women determine the same in any fish purchased at home, keeping separately the waste in cleaning and the bone waste and estimating the price per pound of the edible portion.

2. Use in the diet:

A. As a tissue-building food, fish are as valuable as meat.

B. As a source of energy, the forms with little fat are less valuable than meat, but taking into consideration the fact that much of the fat shown in the composition of meat is lost in cooking, and that fat added in cooking fish is eaten with it, there is much less variation in the fuel value of the two as eaten than the tables of composition would indicate.

C. As a source of flavor in the diet, fish is not so valuable as meat. The flavor can be developed by the method of preparation.

3. Points to be considered in the selection of fish:

A. Proportion of waste.—This determines the real price.

B. Flavor.

C. Demand.—The price is determined by the demand in relation to the supply. Demand is conservative and sticks to certain lines. Other varieties just as good are available. (See economic circulars published by Bureau of Fisheries for data.) The use of frozen fish in winter helps distribute the supply over the year, and consequently decreases the price.

4. Forms in which fish are available:

A. Fresh.

B. Frozen.—This method decreases the price at the time of the year when fresh fish are not available. When frozen fish are properly cared for the quality is as good as fresh. They should be thawed out slowly in cold water.

C. Salting, smoking, and drying make it possible for fish, available in large quantities at one place, to be preserved for shipping. Fish preserved by these methods furnish one of the cheapest sources of protein.

D. Canned fish are available in all parts of the country on account of the ease with which the product can be preserved and transported.

NOTE.—In a community where fresh fish is not available, stress the use of canned, dried, and smoked fish.

5. Points to be brought out in the preparation of fish:

A. It is not necessary to cook for tenderness but just enough to develop flavor and change texture.

B. Add flavor by proper seasoning.

C. Add fat to fish low in fat to increase both flavor and food value.

6. Shellfish:

A. The shellfish commonly used as food are oysters, clams, lobster, crab, and shrimp. Since oysters are most used, they are the only ones that will be considered in detail. In localities where the others are available, lessons on them may be inserted.

(1) The food value of oysters is not high. They contain 88.3 per cent *water*, or as much as milk; *protein*, 6 per cent; *fat*, 1.3 cent; *carbohydrate*, 3.3 per cent; *mineral*, 1.1 per cent. Much of the oyster is liver, which yields a large proportion of uric acid, so that oysters should be avoided by persons suffering from difficulties resulting from an accumulation of uric acid.

(2) Place in the diet.—Oysters are used primarily as a source of flavor, but they are not an economical food. They are easily digested if eaten raw or if not overcooked.

(3) Precautions in using.—Since oysters serve as a medium for the transmission of disease, care must be taken that they are uncontaminated by impure water during their growth and that all containers used in shipping or in marketing them are kept in a sanitary condition.

(4) Method of cooking.—The protein in oysters toughens if they are overcooked. They may either be eaten raw or cooked at a temperature below boiling.

METHOD OF DEVELOPING LABORATORY WORK.

Have the following recipes or similar ones prepared in class, or have some of them prepared at home and reported on in class. Urge the women to learn what types of fish or other sea foods are available locally and the seasons at which they are obtainable, and encourage the use of types of fish available but not generally known. Encourage also the use of smoked and dried fish or frozen fish, if these are not in general use.

BAKED FISH.

Clean and wash well. Fill with a stuffing made from 2 cups bread crumbs, $\frac{1}{4}$ cup of fat, 1 minced onion, $\frac{1}{2}$ teaspoon sage, $\frac{1}{2}$ cup chopped celery, and 1 tablespoon chopped parsley. Lay in a pan, cover with strips of salt pork, or brush the surface with fat and bake 20 to 30 minutes.

PLANKED WHITEFISH.

Select a 1 to 2 pound fish. Clean and remove the backbone and as many smaller bones as possible. Soak the plank well to prevent burning and lay the fish on it skin side down. Place in the oven or in the broiler until fish is tender and slightly browned. Serve with melted butter or maitre d'hotel butter.

MAITRE D'HOTEL BUTTER.

Butter or butter substitute, $\frac{1}{2}$ cup.	Chopped parsley, 1 tablespoon.
Salt, $\frac{1}{2}$ teaspoon.	Lemon juice, $\frac{3}{4}$ tablespoon.
Paprika, $\frac{1}{4}$ teaspoon.	

Cream the butter, add the seasonings, then work in the lemon juice slowly.

EGG SAUCE FOR BOILED FISH.

Thin white sauce, 1 cup.	Parsley, 1 teaspoon, chopped fine.
1 hard boiled egg, chopped fine.	

HOLLANDAISE SAUCE.

Butter, $\frac{1}{2}$ cup.	2 egg yolks.
Boiling water, $\frac{1}{2}$ cup.	Salt, $\frac{1}{4}$ teaspoon.
Lemon juice, 1 tablespoon, or	Cayenne.
Vinegar, $\frac{1}{2}$ tablespoon.	

Mix the unbeaten egg yolks, the lemon juice, and about one-third of the butter in the top of a double boiler over hot water. Stir until the butter is melted, then add gradually the remaining butter, stirring constantly. Season and add gradually the boiling water, stirring constantly until the sauce thickens.

ESCALLOPED FINNAN HADDIE.

Flaked finnan haddie or other smoked fish, 1 cup.	Bread crumbs, $\frac{1}{2}$ cup.
2 hard boiled eggs, chopped.	Fat, 2 tablespoons.
Milk, 1 cup.	Flour, 2 tablespoons.
	Salt and pepper.

Make a white sauce from the fat, flour, salt, pepper, and milk. Place in a baking dish alternate layers of fish and chopped egg. Pour white sauce over, cover with crumbs, and brown well in the oven.

OYSTER STEW.

Melt 3 tablespoons of butter or substitute in a pan, stir in 3 tablespoons of flour, and add a quart of milk, stirring constantly. When thickened, add $\frac{1}{2}$ pint of oysters, season with pepper, salt, and chopped parsley, and remove from the fire as soon as the oysters are heated through and the edges begin to curl.

FRIED OYSTERS.

Drain oysters, dip in egg, roll in crumbs, dip again in egg and roll in crumbs, to form a thick coating over the oyster. Fry in deep fat one minute. Serve hot.

STUFFED BAKED CARP.¹

Prepare carp by skinning and removing entrails. Stuff the carp with dressing made as follows:

Soaked stale bread, 2 cups.	Pepper, $\frac{1}{2}$ teaspoon.
Beef drippings, 4 tablespoons.	Salt, 1 teaspoon.
Ground mace, $\frac{1}{2}$ teaspoon.	

Sew up the opening or tie securely. Place the fish in a dripping pan the bottom of which has been covered with a thin layer of fat and slices of onions. Bake until the fish is a golden brown. Serve with parsley and slices of lemon.

¹Twelve Ways to Cook Carp, Circular 93, University of Wisconsin.

LESSON 7. THE USE AND PREPARATION OF POULTRY AND GAME.

AIM.

To teach the ways of cooking poultry and rabbit.

NOTE.—This lesson takes up particularly the cooking of rabbits, since both the tame and wild species are relatively abundant. In regions where other wild game is available, the teacher should give specific suggestions for its use. General rules for cooking are the same as for poultry and rabbits.

POINTS TO BE BROUGHT OUT.

1. The food value of poultry and rabbit is similar to that of other meats.

Composition of poultry and rabbit.

[Compiled by Louise Stanley from data from various sources.]

Description.	Waste.	Protein.	Fat.	Ash.	Calories per pound.
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	
Chicken, broilers:					
Edible portion.....		21.5	2.5	1.1	402
As purchased.....	41.6	12.8	1.4	.7	289
Fowls:					
Edible portion.....		19.3	16.3	1.0	1,016
As purchased.....	25.9	12.3	12.3	.7	751
Goose, young:					
Edible portion.....		46.7	36.3	.8	1,774
As purchased.....	17.6	38.5	29.8	.7	1,460
Turkey:					
Edible portion.....		21.1	29.9	1.0	1,318
As purchased.....	22.7	16.1	18.4	.8	1,043
Rabbit: Edible portion.....		20.2	18.8	1.1	.....

2. The use of poultry and rabbit is a valuable measure in saving meats and is an economic measure because:

- A. They grow more quickly.
- B. They can be grown largely on other than human foods.
- C. If produced locally their use saves transportation.

3. Economical use:

- A. Waste is less when the animal reaches full growth.
- B. Do not carry through the winter fowls or rabbits except those to be used for egg production or breeding.
- C. Take care of any surplus due to fall supply or products of hunt by:

(1) Canning. (See Unit IX, Lesson 10.)

(2) Making rabbit sausage.

D. Render any excess fat or save fat that cooks out in preparation and use as you would any other household fat. Poultry fat is especially desirable for cooking.

4. Principles observed in cooking these are the same as in the case of other meats. The skin of the fowl helps retain the flavor.

A. Tender fowls and rabbits may be cooked quickly by broiling, baking, or frying.

B. Tougher fowls and rabbits must have long slow cooking in moist heat.

(1) Flavor may be retained and developed by browning before the long cooking.

(2) Flavor may be developed by browning after cooking until tender.

(3) Well-seasoned gravy will help to furnish flavor.

(4) Flavor may be extended by cooking with dressing, dump-lings, cereals, vegetables, etc. (See Lesson 4.)

METHOD OF DEVELOPING LABORATORY WORK.

Either poultry or rabbit may be used for demonstration, or both, according to the availability. Recipes are given below. If home-canned chicken or rabbit can be obtained, it should be brought to class for the women to see and to sample. It may be used in preparing some of the dishes suggested.

ROAST FOWL WITH POTATO STUFFING.

Clean the fowl and stuff it with the potato stuffing given below. For a tender fowl, place in a roasting pan in a moderate oven and bake slowly until tender, basting occasionally with fat. For a tough fowl, cook in the fireless cooker until tender, then stuff and brown in the oven.

POTATO STUFFING.

Hot mashed potatoes, 2 cups.

Bread crumbs, $1\frac{1}{4}$ cups.

1 chopped onion.

1 egg.

Fat, 3 tablespoons.

Salt, $1\frac{1}{2}$ teaspoons.

Sage, 1 teaspoon.

CHICKEN WITH RICE.

An old fowl may be used. Clean and cut into pieces as for frying and roll in seasoned flour or meal. In a frying pan put a small amount of fat, add a sliced onion and a chopped green pepper, and cook until tender. Brown the chicken quickly in the seasoned fat; add 2 cups of hot water and $1\frac{1}{2}$ cups cooked rice. Cover closely and cook slowly until the chicken is tender, adding more water if necessary.

CREAMED CHICKEN.

To $1\frac{1}{2}$ cups white sauce add 2 cups diced cooked chicken. Heat thoroughly, season with salt, paprika, and chopped parsley, and serve on toast or in pastry or mashed potato cases. A chopped hard-boiled egg may be used for garnishing.

ROAST RABBIT.

Wash the rabbit well with soda water. Lay in salted water for an hour. Stuff with onion, celery, or chestnut dressing and sew up. In a baking dish place the following:

1 onion.	1 carrot (diced).
A few cloves.	Whole pepper corns.
1 bay leaf.	

Rub the rabbit with salt and pepper and place in pan, putting fat here and there over the rabbit. Sift a little flour over the top and pour a cup of stock or hot water into the pan. Cover tightly and roast, basting frequently. When ready to serve, place on hot platter and garnish with slices of lemon and cranberry or current jelly.

SPICED RABBIT.

Wash rabbit in soda water. Disjoint hind legs; cut off the saddle, remove the fore quarters. This makes 9 pieces in all. Lay in salt water about an hour. Place rabbit in dish and cover with weak vinegar. Allow to remain overnight. Remove from pickle, salt each piece slightly, and arrange in baking pan. Cut an onion over it and add 1 bay leaf, a dozen pepper corns, a stalk or some leaves of celery, some parsley, a cup of stock, and some of the vinegar in which the meat was soaked. Cover and bake until tender in a moderate oven. Remove to hot dish. Make gravy from the stock in the pan, using drippings and enough browned flour to thicken. Be sure it is well seasoned and pour over the rabbit.

FRIED RABBIT.

Cut in pieces, roll in flour or meal, and brown in fat. Cover and cook slowly on top of stove until tender. Add water, or small amount of gravy if necessary.

LESSON 8. THE DINNER MENU.

AIM.

To outline the chief essentials of a dinner menu so that it may be filled in to give meals of varying degrees of simplicity.

POINTS TO BE BROUGHT OUT.

1. The dinner is frequently the heaviest meal of the day. On this account all the different groups of food should be represented in it.

2. The basic portion of the meal:

A. The main course usually consists of meat or a protein-rich food, a starchy vegetable as potatoes or rice, and a green vegetable to give the mineral constituents. The starch is further increased by the bread, and fat is furnished by the butter, the fat of the protein-rich food and usually some fat is added in seasoning the vegetables.

B. The dessert course furnishes the sweets. Its character should be determined by the remainder of the meal. If the meal is low in fat, a fat-rich pastry might be used or a cream rich in fat. With a meal rich in fat a lighter fruit or ice is more desirable.

C. Other courses which may be added:

(1) Soup or cocktail may be served first as an appetizer. An appetizer is only necessary when the natural appetite fails. Such soup should be well flavored, but not too rich, else it dulls the appetite rather than stimulates it. A fruit cocktail should not be too sweet for the same reason.

(2) The fish course is sometimes used between the first and the meat course. This increases undesirably the amount of protein food in the meal.

(3) The salad course follows or is served with the meat course. In a simple meal it may take the place of the green vegetable. Its contributions are mineral salts and fat. The character of the salad is determined by the other constituents of the meal. Only a light salad should be used with a heavy dinner menu.

Simple standards demand two or three courses of well-prepared simple foods. This is especially necessary when the housekeeper must prepare and serve her own meals. A few dishes well prepared are in much better taste than an elaborate meal in which many courses duplicate the types of food needed.

METHOD OF DEVELOPING LABORATORY WORK.

Have the women plan meals for various occasions and at various costs. Discuss these from the following points of view:

1. Are the desirable food groups represented?
2. Does any one group occur too frequently?
3. Can it be easily prepared and served?
4. If the housewife must prepare the meal alone, can not most of the meal be prepared in advance so as to avoid the rush which frequently comes just before serving the meal?

Have the most desirable of them prepared either at home or in class and the total calories, cost, and time of preparation calculated accurately.

The cost of the meals can be defrayed by charging an adequate price per plate.

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Economic Circular No. 11. Canned Salmon. Cheaper than Meat and Why, including 50 tested recipes.

Economic Circular No. 12. Sea Mussels, What They Are and How to Cook Them, with 18 recipes.

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United States Food Leaflets (see note at end of Lesson 6, Unit II):

No. 3. A Whole Dinner in One Dish.

No. 5. Make a Little Meat Go a Long Way.

No. 8. Instead of Meat.

No. 17. Use More Fish.

United States Department of Agriculture (in cooperation with the Woman's Committee, Council National Defense):

The Day's Food in War and Peace.

UNIT VII.

Batters and Doughs.

GENERAL INFORMATION.

In the section on cereals we called attention to the fact that wheat is the cereal used in largest amounts in Europe and America because it is preeminently the bread cereal. This fact was brought home to us most forcibly during the recent World War.

Wheat is especially adapted to bread making on account of the presence of two proteins, gliadin and glutenin, which unite when the flour is worked with water to form an elastic material called gluten. It is the presence of this gluten which makes possible the light loaf of bread, for it expands as gas is released in the bread and is hardened on heating, fixing the shape of the gas-containing cells and the loaf of bread. The presence of gluten is especially necessary for bread raised by yeast.

No other cereal contains both the proteins necessary to form gluten, and only rye contains one of them, the sticky gliadin. Rye makes a sticky loaf less light than that prepared from the wheat flour.

During the war there was a shortage of wheat due to:

1. Decrease of production in warring countries.
2. Several short crops in America.
3. Supplies in Australia, India, and South America were unavailable on account of shortage of shipping.
4. Some was lost by sinking.

Wheat was essential abroad because practically all the bread there is made at the bakers and must be durable. Such bread is not successfully made with less than 75 per cent wheat.

The American housewife was asked to substitute other flours in the breads made at home because—

1. They were available here.
2. The other cereals can be used more successfully in the quick home breads than in the bakery breads.

In order to distribute this saving equally the housewives were required to buy a definite amount of the so-called substitute flours with every purchase of wheat flour.

The price of wheat flour was controlled by the Government because wheat bread is a basic food, which must be available to those with small incomes. It continued during the war to be our cheapest

food. Through voluntary regulation the use of wheat was controlled among those who were able to pay for more expensive foods so as to have enough wheat bread for use among those who must depend upon the baker and who could not buy the more expensive foods. The high-class hotels were the first to go into the wheatless program.

During last year the United States sent abroad 140,000,000 bushels of wheat without which it is doubtful whether the war would have been won; 120,000,000 bushels were saved out of the normal consumption of the people.

At the present time we have an increased amount of wheat available due to:

1. Availability of supplies in India, Australia, and South America as shipping is released from war purposes.

2. Large crops raised this year in response to call of Food Administration and other agencies.

On the other hand, the crops of some of the other cereals were materially decreased this year as the result of other conditions.

As a result there has been a let-up in the wheat conservation program. The housewife is no longer required to buy the substitutes with the wheat flour and the baker may make an unmixed wheat loaf. On the other hand, the cooperation of all the housewives is needful in a cereal-saving program. This should include:

1. Wise use of all cereals.

2. Continued use of other cereals where they serve as well as wheat.

This is important if we are to do our part in feeding the starving people in Europe and are to have enough food for cattle so as to keep up the normal supply of milk and bring the usual meat supply of the world to something like the normal level. In order to do this intelligently a knowledge of the behavior of the different flours in bread making is essential.

LESSON 1. QUICK BREADS.

AIM.

To give the proportions of ingredients and method of making quick breads, stressing the proportions of flour to liquid.

POINTS TO BE BROUGHT OUT.

1. There are standard proportions for all the typical quick breads. If these proportions are kept in mind, such breads may be prepared

without the use of a recipe. A recipe may be checked to see if it will work or modified to suit the materials on hand.

Table showing standard proportions for quick breads.

Kind.	Liquid.	Flour.	Fat.	Eggs.	Baking powder.	Seasoning.
Batters:						
Popovers.....	1 cup....	1 cup....	1 t.	1	.....	$\frac{1}{2}$ t. salt.
Giddle cake.....	do.....	1 $\frac{1}{2}$ cups....	do.....	1	2 t.	Do.
Waffles.....	do.....	do.....	1 to 3 t.	1 to 2	3 t.	Do.
Muffins.....	do.....	2 cups....	1 t.	1	4 t.	1 t. salt.
Doughs:						
Biscuit.....	do.....	2 $\frac{1}{2}$ -3 cups	3 t. ....	.....	do.....	Do.
Shortcake.....	do.....	do.....	6 t. ....	.....	do.....	Do.

t=teaspoon.

A. The liquid may be milk or water, or both.

B. The flour is standard soft wheat; when other flours are used they should be substituted on basis of rules given in the next lesson.

C. Any sweet cooking fat on hand may be used.

D. Eggs improve the texture of the product. They may be omitted or dried eggs substituted on basis of one slightly rounded tablespoon for each fresh egg. (See Unit IV, Lesson 2.) So-called egg powders seldom contain any egg and so are not good substitute for eggs in viands.

E. The leavening added in the above is baking powder. The popovers are leavened with steam. If sour milk is used soda should be added and the baking powder decreased in accordance with the rules given in Lesson 5.

F. Salt only is suggested for flavor. Sugar may be added if desired.

2. In combining the following points should be held in mind:

A. Beating or kneading wheat flour mixtures after the addition of liquid develops gluten and toughens quick breads.

B. When the leavening agent is a gas liberated from baking powder or acid and soda, batter mixtures should not be allowed to stand too long before baking because the gas escapes.

3. Method of combining quick breads:

A. Batters.—Sift the dry ingredients together. Mix the liquid, melted fat, and slightly beaten egg. Combine the two mixtures, stirring lightly without beating.

B. Doughs.—Sift the dry ingredients. Cut or chop in the fat; add the liquid slowly, handling as little as possible. Roll on a floured board.

4. Baking:

A. Popovers are leavened by steam formed from the large proportion of water present. In order to have this water changed to steam before the mixture cooks so much over the top as to prevent

rising, they are placed in a very hot oven, 225° to 250° C. (437° to 482° F.), and the temperature of the oven decreased. After the popovers have "popped," allow them to cook through. The large center cavity is typical of mixtures leavened in this way.

B. The baking powder mixtures are cooked best in a hot oven, 225° C. (437° F.). Some of the gas is not released until the mixture is heated, and then it is released suddenly. If the temperature is too low the mixtures dry out over the top before raising.

METHOD OF DEVELOPING LABORATORY WORK.

Have the women bring in the recipes they are using for quick breads and show how they conform to the above general rules when the measures are accurately made, and the flour the same. Many of the women have probably trained their judgment so that they just "mix." Have them measure the amounts of ingredients their judgment tells them are correct and see how nearly they conform with the amounts stated above. Have the women prepare in class the mixtures with which they are least familiar and try to have represented a standard example of each group. It is especially important that the products should be up to standard in a group in which the standards tend to be low.

LESSON 2. THE USE OF WHOLE WHEAT AND GRAHAM FLOURS.

AIM.

To give the women an appreciation of the differences in behavior and food value of the different kinds of wheat flour.

POINTS TO BE BROUGHT OUT.

1. Variations in wheat flour are due to:

A. Kinds of wheat used:

(1) Winter wheat or soft wheat is lower in gluten-forming constituents.

(2) Spring wheat or hard wheat is higher in gluten-forming constituents.

B. Method of milling, determining—

(1) Parts of grain ground.

(2) Blending of streams of flour.

2. Milling of flour:

A. The simplest process or the grinding of the whole grain between two stones or rollers results in *Graham flour*, so-called after Sylvester Graham, who was an advocate of the use of this type of flour in the nineteenth century.

B. The next step in the milling is the removal of a portion of the bran from the flour by bolting. This results in the so-called

whole-wheat flour, from which 10 per cent of the grain containing a large portion of the outer bran coat has been removed.

C. *White flour* is prepared by removing both the bran and the dark germ portion of the grain. In order to accomplish this successfully it was found that the whole grain should not be pulverized before sifting, but that the bran and germ should be separated as completely as possible from the endosperm portion before it is ground. The milling process by which this is accomplished is called the gradual reduction process. In it the clean wheat is run through a series of rollers set at graduated distances apart. This product from each of these rolls is sifted to separate the bran and flattened germ from the granular endosperm portion. The endosperm portion is then ground in separate streams and blended. During the war all these streams were blended in a straight of flour which contained 74 per cent of the grain. Ordinarily, only 71 per cent of the grain is found in white flour. The grades are:

(1) *Patents* are the best flours. The short patents have higher bread-making power and are more expensive than the long patents.

(2) *Straight run* is made by blending all the streams.

(3) *Clear grades* and *Red Dog flour* are the cheaper grades of low bread-making power.

3. Comparison of different kinds of wheat flour:

A. Bread-making power.—The patent flours are the best, and the shorter the patent usually the higher bread-making power. This is on account of both the quantity and the quality of the gluten. In times of wheat shortage, it is important to preserve bread-making power.

B. Completeness of absorption.—The white flour with a minimum of indigestible residue is most completely absorbed. This question was a vital one in the time of wheat shortage because the portion of wheat rejected in milling could be used to better advantage by animals than humans. The portion of residue which is not absorbed makes the unbolted flours especially desirable in cases of constipation.

C. Food value.—The food value of the less highly purified flours is higher than that of the white flours as is shown by the following table:

[From "Food Products," by Sherman.]

Description.	Water.	Protein.	Fat.	Carbo- hydrate.	Fiber.	Ash.	Calories per pound.
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	
Graham flour.....	11.30	13.30	2.20	71.40	1.9	1.8	1,628
Whole wheat flour.....	11.40	13.80	1.90	71.90	.9	1.0	1,630
Straight grade white flour.....	12.80	10.80	1.10	74.80	.2	.5	1,600

When we take into consideration the greater yield of flour, 100 pounds of graham and 90 pounds of whole wheat from every 100 pounds of wheat, as compared with 71 pounds of white flour, this more than overcomes the difference in absorption.

The unbolted flours are especially high in mineral and vitamine content. This is important in a restricted diet if the bread makes up any large proportion of it, but can be disregarded if the diet is varied. It is more important in the case of children than adults.

D. Keeping qualities.—The white flours keep better, as the fat and enzymes present in the germ tend to hasten the deterioration of the unbolted flours; also it is more likely to contain developing larvæ of insects.

E. Comparative costs.—Theoretically, the unbolted flours should be cheaper because a smaller amount of wheat is used in their preparation, but in most communities the white and unbolted flours cost the same or the advantage is on the side of the white flours. This is probably due to:

(1) Poorer keeping qualities of the unbolted flours.

(2) Most mills are prepared to handle the bolted flour only and do not care to stimulate a demand for the unbolted.

METHOD OF DEVELOPING LABORATORY WORK.

If there is a mill in the community, have the women visit it. The essential points should be explained before they enter the mill, since the noise there is so great that any explanations are difficult.

During the laboratory period have samples of the various flours on hand; have the woman weigh a well-sifted cupful of each. On this basis substitute hard wheat and unbolted flours for the soft wheat flour used in last lesson in at least one typical mixture. On basis of the results, work out table of substitution. Have other typical mixtures tried out at home and their success reported upon.

LESSON 3. THE USE OF FLOURS FROM OTHER GRAINS THAN WHEAT.

AIM.

To show the women the method of substituting and use of other flours than wheat.

POINTS TO BE BROUGHT OUT.

1. During the scarcity of wheat successful flours have been prepared from other food materials than wheat. Some of these had been

in successful use before; some were not in general use until necessity demanded a greater supply of materials for use in bread making.

A. Kinds available generally are:

Rye.

Corn meal and flour.

Barley.

Oat flour.

Kafir flour.

B. Less usual flours are:

Cottonseed-meal flour.

Soy-bean flour.

Peanut flour.

The above flours are interesting on account of the variety and flavor they introduce into the diet. Where certain flours are more available than the usual cereals there is economy in their use.

2. Comparison of flours from other grains with wheat flour:

A. Bread-making power is less, for no other grain contains both the gluten-forming proteins which are so essential if the bread is to hold up. One other grain, rye, contains one of these proteins, and bread made from it holds together but lacks the lightness of wheat bread.

B. Completeness of absorption depends upon the amount of indigestible residue contained, and varies with the method of milling rather than the kind of cereal used.

C. Food value is practically interchangeable in the different cereal flours as they appear on the market. Greater variations are seen in flours from different portions of the same grain than from different grains.

Table showing composition of different cereal flours.

Description.	Water.	Protein.	Fat.	Carbo- hydrate.	Ash.	Calories per pound.
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	
Barley meal and flour.....	11.9	10.5	2.2	72.8	2.6	1,603
Corn meal.....	12.5	9.2	1.9	75.4	1.0	1,620
Rye flour.....	12.9	6.8	.9	78.7	.7	1,588
Wheat flour.....	12.8	10.8	1.1	74.8	.5	1,600

D. Keeping qualities are, in general, not so good, though this is determined more by the method of milling than by the kind of grain used.

E. Comparative costs are determined by supply and demand. When the price of wheat was controlled by the Government and the people were required to buy a certain proportion of substitutes they were, in general, higher in price. Under ordinary circumstances many of the substitutes are cheaper than wheat flours.

3. General rules for their use in quick breads:

A. They may be used more successfully in quick breads than in the breads leavened by yeast. Any proportion up to 50 per cent may be used successfully in combination with wheat flour. In mixtures containing egg the substitutes may be increased to 75 per cent.

B. Combinations of substitutes may be used with advantage both as to flavor and texture. Some good combinations are:

Rye flour or barley flour and corn flour or rice flour; or

Peanut flour or soy-bean flour and potato flour or corn flour.

C. Substitution should be made on the basis of weight and composition. The batters vary somewhat in consistency from those made from wheat flour alone.

Equivalents of one cup of wheat flour.

Barley flour.....	1½ cups.	Oat flour.....	1 cup. ¹
Buckwheat flour.....	¾ cup.	Peanut flour.....	1 cup. ¹
Corn flour.....	1 cup.	Potato flour.....	¾ cup.
Corn meal (coarse).....	¾ cup.	Rice flour.....	¾ cup.
Corn meal (fine).....	1 cup. ¹	Rye flour.....	1½ cups.
Feterita.....	¾ cup.	Soy-bean flour.....	¾ cup.
Kafir.....	¾ cup.	Sweet potato flour.....	1½ cups.
Milo flour.....	¾ cup.		

¹ Scant.

NOTE.—There is a variation in the thickening quality of flours and meals due to methods of milling, the varying water content and the thickening power of starches from different sources.

D. If cooked cereal, potatoes, or legumes are used in quick breads, the amount of liquid should be reduced and the mixture made stiffer than usual.

METHOD OF DEVELOPING LABORATORY WORK.

Have on hand any available flours other than wheat. Have the women weigh cupfuls and compare with the weights given in tables. Substitute on this basis in some typical flour mixtures. Compare product with those made from all wheat as to texture, flavor, and comparative economy. Have women report upon any use of these flours in their homes.

GRAHAM MUFFINS.

Use the standard proportions for muffins, with 1½ cups Graham flour and ½ cup wheat flour.

CORN-FLOUR OR RICE-FLOUR MUFFINS.

Use standard proportions given above, with ½ cup wheat flour and 1½ cups corn flour, or 1½ cups rice flour.

BERKSHIRE MUFFINS.

Scalded milk, ¾ cup.
One egg.
Salt, 1 teaspoon.
Fat, 1 tablespoon.

Baking powder, 4 teaspoons.
Corn meal, ½ cup.
Wheat flour, ½ cup.
Cooked rice, ½ cup.

Pour the scalded milk over the meal and let stand five minutes. Add the other ingredients, folding in the beaten white of egg last.

RAISIN BREAD.

Corn meal, 1 cup.	Sweet milk, $2\frac{1}{2}$ cups.
Corn flour, 1 cup.	Molasses, $\frac{1}{2}$ cup.
Wheat flour, 2 cups.	One egg.
Baking powder, 6 teaspoons.	Raisins, 1 cup.
Soda, $\frac{1}{2}$ teaspoon.	Salt, 1 teaspoon.

Mix dry ingredients, adding molasses, egg, and milk, mixed. Bake in a loaf in a slow oven one and one-half hours.

LESSON 4. CORN BREADS.

AIM.

To show the nutritive value of corn meal and ways of using it as food.

POINTS TO BE BROUGHT OUT.

1. Importance of corn meal as a food:

A. Abundance.—Corn is the most abundant cereal crop of the United States, the annual production being between three and four times the production of wheat. The general distribution of the crop and the abundant facilities for milling it make corn meal available everywhere with a minimum of transportation.

B. Possibility of an increased supply.—Only a small amount of the corn crop is used for human food, the larger part being fed to animals. Corn and corn products could easily supply a much larger proportion of our diet.

C. Cost.—Corn meal is an economical food. At ordinary prices it is one of our cheapest forms of energy and could well be used to replace some of the more expensive foods.

2. Composition:

A. In composition, corn meal varies but little from the average for cereal flours. (See Lesson 3.) It is used principally as a *source of energy*, although it supplies some *building material*. It is slightly higher in *fuel value* than wheat flour but somewhat lower in *protein*.

B. The composition varies slightly with the method of milling.

(1) In "old process" water-ground meal, the whole grain is crushed and the germ and a large proportion of the bran are retained, thus increasing the amount of fat and mineral in the meal.

(2) In the "new process" or "bolted" corn meal, the germ and most of the bran are removed. The meal is lower in fat and mineral and is not so good in flavor, but its keeping qualities are better.

C. There is practically no difference in composition between yellow and white corn meal made by the same process.

3. Nutritive value: Corn meal is a palatable, nutritious food, possessing much the same food value as wheat flour. The bolted meal, like other refined cereal products, is low in mineral and so-called "vitamines" (see Unit XII, Lesson 3), and if used to make up a large part of the diet, should be supplemented with foods such as milk, eggs, and green vegetables, which supply this deficiency.

4. Uses of corn meal:

A. In breads.—Corn meal may be used alone or combined with wheat flour or other flours or meals in a large variety of breads. These may be—

(1) Simple corn breads, such as corn dodgers or hoe cake, which are raised by the steam forming during cooking. They contain corn meal, salt, and liquid, and sometimes a small amount of fat: are easily made, economical, and palatable. They are usually eaten hot.

(2) Breads leavened with soda or baking powder, such as griddle cakes, muffins, or corn pone. Egg may or may not be used as a binder. When used it improves the texture and the food value. When egg is omitted, a small amount of wheat flour may be used for the gluten. (See Lesson 2.) This impairs the flavor for those who like corn bread.

(3) In yeast bread corn meal may be substituted for a part of the wheat flour. (See Lesson 1.) It may be combined with the flour or cooked to a mush and added to the sponge. The latter method gives a less dry loaf.

B. Other ways of using corn meal:

(1) In mush, served as a cereal porridge, or in place of a starchy vegetable, or sliced cold, sautéed, and served in place of buttered toast.

(2) As a main dish; generally combined with foods high in fat or protein such as meat, fish, or cheese, in loaves, escaloped dishes, croquettes, etc.

(3) As a dessert, in puddings, cakes, or cookies.

METHOD OF DEVELOPING LABORATORY WORK.

Discuss the availability of corn meal and its cost as compared to other cereals. Ask for suggestions as to variety in using corn meal and good combinations with other foods. Use in demonstration some of the old-fashioned breads which are especially economical. Include recipes with and without eggs. Show how sweet milk and baking powder may be used interchangeably in the recipes with sour milk and soda (one-half teaspoon soda to one cup sour milk). Bring out the point that corn meal thickens up in cooking more than wheat flour does, and therefore batters made with corn meal should be

thinner than those made from wheat flour. Corn breads also require a higher temperature in baking. The following recipes may be used or others taken from Farmers' Bulletin No. 565, or suggested by students.

CORN-MEAL MUSH.

Water, 4 cups or milk, $3\frac{1}{2}$ cups. Salt, 1 teaspoon.
Corn meal, 1 cup.

Bring the liquid to the boiling point and sift in the meal, stirring to prevent lumping. Cook 45 minutes or longer. It may be cooked in a double boiler or in the oven to avoid spattering.

CORN DODGER.

Corn meal, 2 cups. Fat, 2 teaspoons.
Salt, 1 teaspoon. Boiling water, $1\frac{3}{4}$ cups.

Pour the boiling water over the other materials; beat well. Make into small cakes and bake in a hot oven.

QUICK CORN BREAD.

Corn meal, 2 cups. Milk, 2 cups.
Baking powder, 4 teaspoons. Melted fat, 2 tablespoons.
1 egg. Salt, 1 teaspoon.

Bake in a shallow pan for 30 minutes.

POTATO CORN-MEAL MUFFINS.

Milk, 1 cup. Mashed potato, 1 cup.
1 egg. Corn meal, 1 cup.
Melted fat, 1 tablespoon. Baking powder, 4 tablespoons.

Mix in order given. Bake 40 minutes.

SPOON CORN BREAD.

Cornmeal, 1 cup; water, 2 cups; mix and cook into a mush, cool and add—
Salt, $\frac{1}{2}$ teaspoon. Milk, 1 cup.
Butter substitute, 1 tablespoon. Yolks of 3 eggs.

Fold in the beaten whites of the eggs last. Pour into a greased baking dish and bake 30 minutes in a moderate oven. Serve in baking dish with spoon.

BOSTON BROWN BREAD.

Corn meal, 1 cup. Baking powder, 1 teaspoon.
Rye meal or flour, 1 cup. Soda, $\frac{3}{8}$ teaspoon.
Graham flour, 1 cup. Milk or water, 2 cups.
Molasses, $\frac{1}{2}$ cup. Salt, 1 teaspoon.

Nuts or raisins, $\frac{1}{2}$ cup; both may be added if desired.

Mix, fill greased molds two-thirds full of the batter and steam two and one-half hours.

CORN-MEAL FISH CAKES.

Corn-meal mush, 2 cups.	Chopped parsley, 1 tablespoon.
Shredded fish, 1 cup.	Salt, $\frac{1}{2}$ teaspoon.
Chopped onions, 2 tablespoons.	

Shape into small cakes, and brown in a small amount of fat or in the oven.

INDIAN PUDDING.

Corn meal, $\frac{1}{4}$ cup.	Cinnamon, 1 teaspoon; or ginger, 1
Boiling water, 1 cup.	teaspoon.
Sirup or molasses, $\frac{1}{2}$ cup.	Salt, 1 teaspoon.
Milk, 3 cups.	

Cook the corn meal, milk, and water to a mush. Add the other ingredients and bake in a greased pan for two hours. Serve with sauce.

NOTE.—In communities where corn meal is not liked this lesson should be combined with the last.

LESSON 5. SOUR MILK AND MOLASSES MIXTURES.

AIM.

To show the women the principles underlying the leavening of batters and doughs and enable them to vary the forms of leavening called for in a given recipe.

POINTS TO BE BROUGHT OUT.

1. In order to leaven a batter or dough it is necessary to incorporate in it during mixing or have liberated in it during mixing or baking a gas which expands on heating, raising the product. The heat sets the gas-containing cells, making the product retain its shape.

2. The more usual leavening agents are:

A. Air which may be incorporated by entrapping in egg white or beating directly into the mixtures.

B. Baking powders are frequently used on account of their convenient form. They all contain baking soda and a mild acid. When water is added to mixtures containing baking powder the acid reacts with the soda releasing carbon dioxide.

C. Steam is, as we have seen, the leavening agent in case of popovers. It is formed by the volatilization of a portion of the liquid and is probably a contributing factor in the leavening of other types of bread. Steam is evidently the factor in puff pastry. Articles leavened by steam are cooked in very hot oven at first to facilitate steam formation.

D. Yeast and bacteria are used as means of leavening bread. Both these are small, one-celled plants which act upon certain ingredients in the dough and give off gases. If they are mixed with the dough the gas is given off in the bread and may be used to leaven it. Yeast is most used and may be obtained on the market in several forms. (See Lesson 6.) Bacteria are the source of the gas in salt-rising bread. The organism will not live long in moist form as compressed yeast cake, but can be dried in corn meal and kept for a longer time in that form.

E. Soda with an acid as in sour milk or molasses. When soda is added to sour milk the acid in the milk reacts with the soda, setting free a gas, carbon dioxide. The gas can be seen escaping from the mixture in the form of tiny bubbles. We take advantage of this fact in the leavening of bread. In this case the soda should be thoroughly mixed with the dry ingredients, so when the sour milk is added the gas is released but is held in by the batter or dough. Molasses and other acid sirups, as honey and sorghum, may be used in the same way.

F. Baking powders are made up of soda and an acid powder. These are mixed with starch to keep them dry. The powder is sifted with the dry ingredients of the mixture and reacts when the liquid is added. There are four general types of baking powder on the market according to the form of acid used. They are:

- (1) Tartrate.
- (2) Phosphate.
- (3) Alum.
- (4) Alum phosphate.

3. Proportions.—The amount of leavening agent to be used is based upon the amount of flour. An experienced worker who handles her materials quickly can use less than one with less experience.

A. The proportions given for *baking powders* vary from one to two teaspoonfuls for each cup of flour. The first will be successful in the hands of the skilled worker; the second is better for the unskilled worker or in case the batter must stand. Practically all standard baking powders contain the same amount of available gas. Some react more readily than others in the cold and so may lose their gas in the can, or lose it more readily on mixing than the powders which do not react until heat has been applied.

B. With the *soda* mixtures the amount of soda to be used is based upon the amount of acid liquid. The table below gives the amount for each cup of the acid solution.

Cup of acid solution; amount of soda.

Sour milk -----	scant $\frac{1}{2}$ teaspoon	Sorghum -----	1 teaspoon
Molasses -----	$\frac{3}{4}$ teaspoon	Honey -----	$\frac{1}{4}$ teaspoon

These products vary in acidity and so the amount of soda can only be approximated. In substituting a mixed sirup for molasses the soda should be omitted and baking powder added. In using soda and acid in recipes calling for baking powder, one teaspoon of soda is the equivalent of four to five teaspoons of baking powder, providing, of course, that there is enough acid present to liberate all the gas it contains.

C. Sponge cakes are the best illustrations of mixtures leavened only by *air* beaten into egg whites. Each egg white is equivalent in leavening power to one-half teaspoon of baking powder. In the case of butter cakes the baking powder can be decreased by this much for every beaten egg white added.

D. *Steam* can not be substituted for other methods of leavening. It is only applicable under special conditions.

4. Influence of type of leavening agent on temperature of baking:

	Degrees.	
	Centigrade.	Fahrenheit.
A. Baking-powder mixtures, hot oven.....	225	437
B. Soda same as baking powder.....	225	437
C. Mixtures leavened with air, low temperature.....	175	347
D. Mixtures leavened with steam, high at first, then lower.....	240-250	464-482
E. Combination of steam with air as in butter cakes.....	190-200	374-392

METHOD OF DEVELOPING LABORATORY WORK.

The points stressed should depend upon the interests of the women present. In general, they will be most interested in examples of the different methods of leavening selected to illustrate the principles of substitution. The following are suggested:

Cream puffs to illustrate use and handling of steam. Leave illustration of air as leavening agent to cake lessons. Have batters and doughs prepared with sour milk, changing recipes from use of baking powder to use of soda and sour milk. Calculate amount of soda necessary and determine whether or not additional baking powder is necessary.

Gingerbread gives a good opportunity for the use of soda with an acid sirup, and Boston brown bread will illustrate the use of a combination of sour milk and molasses.

Yeast as leavening is given in next lesson. If the women are interested in baking powders, different types may be provided for study. These should be compared as to price, amount recommended for use on the package, action in cold and on heating, and whether or not its use gives a distinctive taste to the product.

CREAM PUFFS.

Butter, $\frac{1}{4}$ cup.	2 eggs.
Hot water, $\frac{1}{2}$ cup.	Flour, $\frac{1}{2}$ cup.

Add the hot water to the butter, and when boiling add the flour and beat vigorously. As soon as the ingredients are well blended, remove from the fire. Add the unbeaten eggs, one at a time, and beat the mixture until smooth. Drop by tablespoonfuls onto a buttered pan and shape into a circle a little raised in the center. Bake 30 minutes in a moderate oven.

MOLASSES GINGERBREAD.

Sour milk, 1 cup.	Ginger, 2 teaspoons.
Molasses, 1 cup.	Baking soda, 1 teaspoon.
Fat, 2 tablespoons.	Cinnamon, 1 teaspoon.
Flour, $2\frac{1}{2}$ cups.	Salt.

Mix the dry ingredients. Mix the sour milk and molasses and add the dry ingredients to them. Melt and add the fat. Beat thoroughly and pour into a shallow greased pan. Bake 20 minutes in a moderate oven.

BOSTON BROWN BREAD.

Rye meal, 1 cup.	Molasses, $\frac{1}{2}$ cup.
Corn meal, 1 cup.	Baking soda, 2 teaspoons.
Graham flour, 1 cup.	Cream of tartar, 2 teaspoons.
Sour milk, 2 cups.	Salt, $\frac{1}{4}$ teaspoon.

Mix the dry ingredients. Mix the sour milk and molasses and add the dry ingredients to them. Mix well. Turn into greased pans and steam four hours. Remove from the pans and dry in the oven.

LESSON 6. YEAST BREADS.

AIM.

To give the principles involved in the making of yeast bread and to show possible variations in ingredients.

POINTS TO BE BROUGHT OUT.

1. Ingredients used in yeast bread:

A. The necessary ingredients used in yeast bread are liquid, yeast, and flour. Other ingredients usually added are salt, fat, and sugar, or other sweetening.

(1) The liquid used may be milk, water, milk and water mixed, potato water, cereal water, whey, or buttermilk. If milk is used it should first be scalded and cooled to prevent it from souring during the bread-making process. Buttermilk gives a distinctive flavor to the bread and the lactic acid present makes the loaf white and tender and lessens the time the bread requires to rise.

(2) The yeast used in bread is made up of a large number of tiny plants, which grow and multiply in the dough and form the gas which causes the bread to rise.

(a) Compressed yeast contains active yeast plants, which grow quickly, but it spoils rapidly and must be kept in a cool place or purchased fresh each time bread is made.

(b) Dry yeast can be kept indefinitely, but the yeast plants are in a less active form and begin to grow only after they have been supplied with food and water. Bread made with this type of yeast does not rise so quickly unless the yeast is first mixed into a sponge and left a few hours until the yeast plants begin to grow rapidly.

(c) Liquid yeast is an active form grown at home in a specially prepared mixture, which may or may not contain hops. It may be allowed to ferment spontaneously or may be inoculated with fresh or dried yeast. The latter is a safer method. It will keep for several weeks in a cool place.

(3) Salt is added for flavor. Too much salt will retard the action of the yeast.

(4) Fat may be entirely omitted, if preferred. A small amount of lard or vegetable oil is usually added to the dough for tenderness. Fat rubbed over the crust after baking makes it more tender.

(5) Sugar is used for flavor and to hasten the growth of the yeast. Sirup may be used in place of sugar.

(6) Flour.—

(a) Wheat flour is most desirable for making yeast bread because it alone of all cereals contains two proteins which form an elastic substance called gluten, when the flour is worked with water, as in the process of making dough. Gluten is the substance which enables the dough to stretch in rising and to hold its shape when baked. The amount and quality of the gluten vary with the kind of wheat and the method of milling. Hard or spring wheat usually is higher in gluten than soft or winter wheat, and is therefore preferred for making yeast bread. Rye contains one of the proteins necessary to form gluten, but it will not make so large nor so light a loaf.

(b) Other materials may be used in yeast bread if combined with enough wheat flour to furnish the necessary gluten. Such materials are:

(1) Cereals.—Corn, barley, rice, feterita, rye, oats, Kafir, milo.

(2) Fruits, vegetables, and legumes.—Peanuts, sweet potatoes, buckwheat, taro, potatoes, beans, tapioca, banana.

(c) Forms in which other materials may be added:

(1) As a flour or fine meal, mixed with the wheat flour.

(2) Cooked or scalded and cooled. This method is used with coarse meals or whole grains. In making the bread, allowance must be made for the liquid absorbed.

(3) Cooked and mashed to a pulp. This method is used for vegetables and for legumes. Allowance must be made for water absorbed in cooking, as mentioned above.

(d) Amount of other materials which may be added:

(1) A substitution of 25 per cent or less of other materials produces a loaf of standard lightness and only slightly smaller than an all-wheat loaf.

(2) A substitution of as much as 50 per cent produces a small heavy loaf, but with a good flavor. More than this amount of substitution is not satisfactory except in skilled hands.

(3) If cooked cereal, vegetable, or legumes are added, no more than 25 per cent should be used, else the bread will be soggy.

(e) Method of measuring substitute flours or meals—Since the different flours and meals absorb different amounts of liquid they should be substituted for wheat flour not cup by cup, but on the basis of weight and composition. (See table in previous lesson.)

2. Methods of mixing yeast bread:

A. Sponge method; long or overnight process (12 to 16 hours).—The yeast (if dry or compressed) is softened in a small amount of the liquid, which should be lukewarm, and combined with the sugar, the remaining liquid, and one-half the flour (or less) to make a soft batter. In the morning the fat, salt, and remaining flour are added, the dough kneaded well to develop the gluten and bring the yeast in contact with all the flour. The dough is allowed to rise to twice its bulk, kneaded, allowed to rise again, molded into loaves, and when risen to twice its bulk, baked.

B. Sponge method; short process (6 to 8 hours).—By doubling the amount of yeast and proceeding as above the time may be reduced one-half.

C. Straight dough method; long process (12 to 16 hours).—The yeast is softened in a small amount of the liquid; then all the ingredients are combined at once to form a dough. The kneading and rising are carried on as in A.

D. Straight dough method; short process (6 to 8 hours).—Double the amount of yeast and proceed as in C.

3. Importance of correct temperature.—Since the yeast is a plant, it grows best at a warm temperature, about 27° to 30° C. (80° to 86° F.), and for best results this temperature should be maintained throughout the process. If allowed to overheat, the bread will have heavy streaks in it. If allowed to chill, the action of the yeast is retarded.

4. Baking.—The temperature of the oven for baking should be 218° C. (425° F.) at first to check the rising, then lowered to 193° C. (380° F.) until the bread is cooked through. A loaf of average size requires about 50 minutes. If baked in single pans the loaves will be more evenly baked and more uniform in shape.

5. Special points in mixing and baking breads containing wheat substitutes:

A. A larger amount of yeast should be used. When yeast action is slow, certain products are formed, the exact nature of which is not known, which tend to break down the gluten. Where the amount of gluten is small, as in breads containing wheat substitutes, the rising should be hastened, so that the bread can be baked before the gluten is affected.

B. Breads containing wheat substitutes should be made up stiffer than are all-wheat doughs. If necessary, additional flour should be added to give the desired consistency.

C. Bread containing substitutes should be thoroughly baked. Rye bread requires a longer baking at a lower temperature than breads made with other substitutes.

6. Care of bread after baking.—Loaves should be placed where air can circulate freely around them until they are thoroughly cooled. Wrapping bread while warm tends to spoil flavor, and may cause mold since the wrapping holds in moisture.

7. Food values of yeast bread.—Bread made from patent wheat flour yields about 1,200 calories a pound. There is little difference in the nutritive value of bread made from wheat flour and bread containing other flours, provided the flours have been milled by the same process. Bread containing flours made from the whole grain furnish a much larger amount of mineral matter than bread made from the more refined flour.

8. Economical use of bread.—Economy should be practiced in the use of bread. This will include:

A. Care in making, to produce a loaf of the best quality and thereby avoid the waste that occurs when a poor quality of bread is made or served.

B. Care in serving, that when an abundance of starchy vegetables or cereals in some other form is served, little or no bread is used.

C. Care of left-over breads, crusts, or crumbs. They may be dried in the oven, ground or crushed and kept for use in puddings, dressings for meat, poultry, or fish, griddle cakes or muffins, scalloped dishes, or croquettes.

METHOD OF DEVELOPING LABORATORY WORK.

Since it is difficult to condense the continuous bread-making process into a laboratory period, a loaf of bread should be started beforehand, either by the teacher or by a member of the class. When the class meets, the setting of the sponge and the first kneading should be demonstrated, then the dough prepared beforehand may be kneaded, placed in the pans, raised, and baked. In this way all stages of the process will be clearly shown. The bread started in class may be taken home by one of the women to be baked later.

The standard proportions given below should be used. Either straight dough or sponge method may be demonstrated. Suggest home methods of controlling temperature for bread (hot water, sponge box, fireless cooker, etc.). Stress the importance of care and cleanliness as affecting the quality and flavor of bread.

For home work, each woman may be asked to bake a loaf of bread under home conditions and bring it to class for criticism. The use of a score card in comparing the different loaves will be of assistance in establishing a standard.

STANDARD PROPORTIONS FOR ONE LOAF OF BREAD.

Liquid, 1 cup.	Flour, 3 to 4 cups.
Salt, 1 teaspoon.	Yeast, $\frac{1}{2}$ cake compressed or $\frac{1}{4}$ cup liquid yeast.
Fat, 1 tablespoon or less.	
Sugar, 1 tablespoon.	

Note: The amount of yeast given is for the short, straight dough process. When liquid yeast is used, the amount of liquid given for the bread should be reduced to $\frac{3}{4}$ cup.

WHOLE WHEAT OR GRAHAM BREAD.

Liquid, $1\frac{1}{4}$ cups.	Whole wheat or Graham flour, 3 cups.
Salt, 1 teaspoon.	Yeast, $\frac{1}{2}$ cake compressed or $\frac{1}{4}$ cup liquid yeast.
Sugar, 1 tablespoon.	

POTATO BREAD.

Irish potatoes cooked and mashed or riced, 1 cup.	Sugar, 1 tablespoon.
Liquid, $\frac{1}{2}$ cup.	Flour, $2\frac{1}{2}$ cups.
Salt, $1\frac{1}{2}$ teaspoons.	Yeast, $\frac{1}{2}$ cake compressed or $\frac{1}{4}$ cup liquid yeast.

RYE BREAD.

Use the standard proportion, substituting $2\frac{1}{2}$ cups wheat flour and $2\frac{1}{4}$ cups rye flour for the amount of wheat flour given.

WHOLE WHEAT AND CORN FLOUR BREAD.

Use the standard proportions, substituting $1\frac{3}{4}$ cups wheat flour, $1\frac{1}{4}$ cups whole wheat flour, and $\frac{3}{4}$ cup corn flour for the amount of wheat flour given.

LESSON 7. SANDWICHES.

AIM.

To teach the women how to prepare sandwiches suitable for different occasions.

POINTS TO BE BROUGHT OUT.

1. Definition.—A sandwich is a combination of a cover, usually bread, with a filling of meat, vegetable, fruits, etc. It is usually prepared so that it can be eaten without the use of a knife, fork, or spoon. For this reason it is especially desirable for the buffet meal or the lunch which must be carried from home.

2. Cover portion.—Any kind of bread may be used as cover and variety may be introduced in the sandwiches by choice of different kinds, as Graham, whole wheat, brown bread, or even cake with the sweet sandwiches. As a rule the bread used for sandwiches should be at least 24 hours old, so that it can be cut thinly without crumbling.

3. Fillings.—The fillings which may be used are many. They should not be too moist or the bread will become soggy and unpalatable. A thin layer of fat over the bread before adding the filling helps to prevent this.

A. Protein-rich sandwiches:

(1) Meat, sliced or minced. In both cases it should be well seasoned.

(2) Cheese, sliced or cheese paste.

(3) Nuts, chopped or ground.

(4) Beans.—Buns filled with hot baked beans have proved to be favorites in some school lunchrooms.

(5) Fish, as smoked salmon, sardines, salmon.

B. Salad sandwiches:

(1) Lettuce, usually combined with mayonnaise. Nuts may be used also.

(2) Celery.

(3) Cress.

(4) Tomato. If bread is spread with mayonnaise and protected with lettuce leaves it is not made soggy by the use of tomato.

(5) Cucumber.

C. Sweet or dessert sandwiches:

(1) Dried fruits ground to paste and combined with honey. Nuts may or may not be used.

(2) Marmalades, jellies, and jams.

(3) Fudge poured over crisp crackers and two placed together.

(4) Marguerites.

(5) Sweet chocolate melted to paste and spread over bread.

4. Handling.—Slice bread thinly and neatly. Do not remove crust. Wrap in oil paper or slightly dampened cloth to keep bread from becoming dry.

METHOD OF DEVELOPING LABORATORY WORK.

Have the women prepare typical sandwiches, suggesting those especially adapted for different uses, as the child's lunch, the husband's lunch pail, Sunday night supper, or the afternoon tea. Emphasize the kinds especially adapted to the needs of the women in the class. Combine these in the school child's lunch, the business girl's lunch, the man's lunch pail, and criticize the combinations and amounts desirable. (Do they form a well-balanced meal?) Suggest dishes that might be added to the lunch taken from home and if possible have some of these prepared and shown. Each woman might be asked to work on the lunch problem she has to meet in her home and report her results in class.

LESSON 8. CAKES AND COOKIES.

AIM.

To teach the principal points involved in making cakes and cookies, and to show the possible variations in the ingredients used.

POINTS TO BE BROUGHT OUT.

1. Types of cakes:

A. Sponge cakes—

(1) True sponge cakes contain no fat and no liquid except that present in the eggs and flavoring, and no leavening agent except the air which is incorporated into them by means of the beaten eggs. They contain equal measures of eggs, flour, and sugar

(or the equivalent in other sweetener), and usually have a small amount of lemon juice added for flavoring and for tenderness.

(2) Variations:

(a) A true sponge cake contains the whole egg yolks and whites in equal proportions.

(b) Sunshine cake is a sponge cake containing more whites than yolks of eggs.

(c) Angel cake is a sponge cake containing only whites of eggs. The lemon juice is omitted and a teaspoon of cream of tartar is used instead. The water contained in the additional whites of eggs takes the place of the liquid furnished by the lemon juice.

(3) Cheap sponge cake is made by omitting a part of the eggs and adding for each egg omitted two tablespoonfuls of water and one-half teaspoon of baking powder. Any number of eggs up to one-half the total amount may be omitted.

(4) Method of combining sponge cakes.—Since the leavening agent is the air beaten into the egg whites, the other ingredients are combined first and the beaten egg whites folded in last, handling as little as possible, so the air will be retained.

(5) Method of baking.—Since sponge cakes are leavened by air, they should be baked slowly at a low temperature. (See Lesson 5.)

B. Butter cakes:

(1) Butter cakes differ from sponge cakes in that they contain a liquid, fat, and a leavening agent, usually baking powder, besides the eggs, flour, and sugar. The proportions of the ingredients vary according to the sweetness, texture, richness, and size of the cake desired.

(2) Variations:

(a) The *liquid* used may be either milk or water or both. For an average-sized cake containing three cups of flour, from three-fourths to one cup of liquid is used.

(b) The fat used may be butter or butter substitute, lard, compound, poultry fat, or vegetable oil. The amount varies from one-fourth cup to one cup, depending on the richness desired. As the amount of fat is increased the liquid is decreased.

(c) One to two cups *sugar* may be used. Other sweeteners may take the place of the sugar. (See Unit VIII, Lesson 3.)

(d) The *eggs* used vary from one to four whole eggs, or the equivalent in either whites or yolks. The number of eggs used affects the size and the nutritive value of the cake.

(e) The amount of *flour* used in a cake of standard size is three cups. The kind may be either wheat flour, part wheat

flour and part substitutes (see Unit VII, Lesson 3), or all substitutes. The egg used in cakes acts as a binder and can take the place of the gluten in the wheat flour. For delicate, rich cakes the minimum amount of substitute flour should be used. The maximum amount may be used in plain cakes or cookies where texture is not important. Rice, corn, or oat flours may be used in white cakes where flavor is important. Barley, rye, or buckwheat flour are suitable for chocolate or spice cakes where the color is not important and the flavor is covered by other ingredients. Peanut flour is especially desirable for cookies on account of its flavor.

(f) Chocolate, spices, nuts, or raisins may be added for variety.

(3) Methods of combining:

(a) Usual method.—The fat and sugar are creamed, the beaten yolks of the eggs added, and the liquid and flour added alternately. The beaten whites of the eggs are folded in last.

(b) The quick method.—The eggs are slightly beaten together, the liquid and sugar added, then the flour. The melted fat is added last, and the batter is well beaten. A cake mixed by this method is not so large as in method (1), but the texture is as good. The size may be increased by adding an additional teaspoonful of baking powder to take the place of the air incorporated in the beaten egg white.

(c) Combination method.—Mix as in (2), reserving the egg whites and adding them, well beaten, at the last. This method produces a cake as large as (1) with as good texture, and requires less time in mixing.

C. Cookies:

(1) Cookies may be made like a butter cake, either plain or rich, and varied by adding chocolate, spices, nuts, fruit, or similar ingredients. They may be classed as:

(a) Drop cookies, in which the consistency of the batter is such that it may be dropped by spoonfuls on a tin and baked.

(b) Roll cookies, in which the amount of liquid is decreased until a stiff dough is obtained.

2. Economical use of cakes and cookies:

A. Cakes and cookies are foods with high fuel value. This fact should be considered in serving them, so that they will furnish a real part of the meal and not be eaten in addition to a meal which is already sufficiently heavy.

B. Left-over cake may be served with fruit, sauce, or with custards or crushed into crumbs and used in puddings.

METHOD OF DEVELOPING LABORATORY WORK.

Use standard recipes or have the women bring recipes from home and reduce them to the basis of three cups of flour, so that they will see how little variation there really is in the different proportions usually found in recipe books; either these recipes or the ones below may be demonstrated. See Unit V, Lesson 2, for suggestions as to the use of fat, and Unit VIII, Lesson 3, for the use of sirups in cakes and cookies. Have one recipe demonstrated, using the three methods of combining given in B (3) and let the women compare the results as to (1) time required for mixing, (2) texture, (3) size of cake.

SPONGE CAKE.

4 eggs.	Wheat flour, 1 cup.
Sugar, 1 cup.	Salt, $\frac{1}{2}$ teaspoon.

PLAIN BUTTER CAKE.

Sugar, $\frac{1}{2}$ cup.	3 eggs.
Fat, $\frac{1}{3}$ cup.	Wheat flour, 3 cups.
Milk, $\frac{3}{4}$ cup.	Baking powder, 5 teaspoons.
Salt, $\frac{1}{2}$ teaspoon.	Vanilla, 1 teaspoon.

CHOCOLATE CAKE.

Fat, $\frac{1}{2}$ cup.	Wheat flour, 3 cups.
Sugar, $1\frac{1}{2}$ cups.	Chocolate, 2 squares.
Three eggs.	Vanilla, 1 teaspoon.
Milk, $\frac{3}{4}$ cup.	Salt, $\frac{1}{2}$ teaspoon.
Baking powder, 6 teaspoons.	

SPICE CAKE.

Fat, $\frac{3}{4}$ cup.	Cinnamon, 1 teaspoon.
Sugar, $1\frac{1}{2}$ cups.	Allspice, 1 teaspoon.
Three eggs.	Wheat flour, 3 cups.
Milk, $\frac{3}{4}$ cup.	Vanilla, 1 teaspoon.
Baking powder, 6 teaspoons.	Salt, 1 teaspoon.
Cloves, $\frac{1}{2}$ teaspoon.	

CHOCOLATE-NUT COOKIES.

Sugar, $\frac{1}{2}$ cup.	Wheat flour, 1 cup.
Honey, 2 tablespoons.	Baking powder, 1 teaspoon.
Chocolate, 2 squares.	Vanilla, 1 teaspoon.
Nuts, $\frac{1}{2}$ cup.	Salt, $\frac{1}{2}$ teaspoon.

Mix and drop by spoonfuls on greased baking sheets.

PEANUT WAFERS.

Graham flour, 2 cups.	Sugar, $\frac{3}{4}$ cup.
Crushed peanuts, $1\frac{1}{2}$ cups.	Fat, 2 tablespoons.
Baking powder, 2 teaspoons.	Salt, 1 teaspoon.
One egg.	

If necessary, add milk to make a stiff dough. Roll thin, cut, and bake in a fairly hot oven.

CORN FLOUR COCONUT COOKIES.

Fat, $\frac{1}{2}$ cup.	Wheat flour, $1\frac{1}{2}$ cups, and corn flour,
Salt, $\frac{1}{2}$ teaspoon.	$1\frac{1}{2}$ cups; or 3 cups wheat flour.
Sugar, $\frac{1}{2}$ cup.	Baking powder, 2 teaspoons.
	Milk, 2 tablespoons.

REFERENCES.

United States Department of Agriculture:

- Farmers' Bulletin 807. Bread and Bread Making in the Home.
- Farmers' Bulletin 955. Use of Wheat Flour Substitutes in Baking.
- Farmers' Bulletin 565. Cornmeal as a Food: Ways of Using it.
- Farmers' Bulletin 817. How to Select Food: 11, Cereal Foods.
- Farmers' Bulletin 249. Cereal Breakfast Foods.
- Farmers' Bulletin 559. Use of Corn, Kafir, and Cowpeas in the Home.
- Farmers' Bulletin 298. Food Value of Corn and Corn Products.
- Circular 110. Use Peanut Flour to Save Wheat.
- Circular 111. Use Barley to Save Wheat.
- Circular 113. Use Soy-Bean Flour to Save Wheat.
- Circular 119. Use Rice Flour to Save Wheat.
- Circular 117. Use Corn Meal and Corn Flour to Save Wheat.

United States Food Leaflets. (These leaflets are no longer available for distribution.)

- No. 2. Do You Know Corn Meal?
- No. 6. Do You Know Oatmeal?
- No. 18. Rice.
- No. 19. Hominy.

UNIT VIII.

Sugar and Sweets.

GENERAL INFORMATION.

The sugar bowl has returned to the table. During its absence there was much discussion of sugar, the reasons for the shortage, its real place in the diet, and possible substitutes. It seems worth while to review this material to see what lessons may have been learned that will be of value in normal times.

1. The use of sugar was restricted because there was a reduced supply as the result of:

A. The actual decreased production of beet sugar, which is largely produced in the countries which were at war. Most of the sugar factories of France were destroyed.

B. The loss of sugar by submarine sinkings.

C. The lack of available tonnage for the transportation of cane sugar.

2. Sugar restrictions have been removed because of:

A. An accumulation of sugar as a result of war-time restrictions.

B. The availability of this year's crops of cane and beet sugar.

C. Cessation of submarine sinkings.

D. Increasing availability of stocks of sugar in Cuba, Java, and elsewhere, as ships can be spared to transport them.

E. The continued short sugar ration among European nations. There is not enough sugar in the world to supply everyone with unlimited amounts. At present European nations prefer to use their share of available tonnage for other foods, especially fat.

3. Our storage facilities are limited, so for the present it seems best to eat more sugar and thus save fats for export. The use of other sweeteners is especially helpful in that it utilizes local, more quickly available supplies.

4. During the period of sugar shortage we found that:

A. Sugar is not an essential article of diet—

(1) The energy which it contains may be supplied equally well by other foods.

(2) Sugar is valuable as a source of flavor, which makes our food more attractive, and so is a psychological factor in the diet. This sweet flavoring may be supplied equally well from sirups and dried fruits.

B. The use of other sweeteners offers a real contribution to the diet in the variety of texture and flavor obtained by their use.

C. The high prewar consumption of sugar was due to the following reasons:

(1) It is a cheap and easily available source of energy.

(2) Its flavor is pleasing.

D. Too large a sugar and candy consumption is not desirable.

(1) Sugar is absorbed very quickly and so blunts the appetite for more solid food. For this reason sweets should not be served at the beginning of the meal. Fruit cocktails should not be too sweet.

(2) Sugar furnishes energy but no building material. This is especially bad when children eat sugar to the exclusion of more valuable foods. Most of the sirups and dried fruits contain mineral constituents along with the sugar and so are more desirable in the diet.

5. Forms of sugar which appear in foods.—The common use of the word “sugar” refers to commercial cane or beet sugar. We do not need to rely on it as our only source of sugar, for many foods contain different forms of sugar which can just as well be used by the body as a source of energy.

Forms of sugar found in many foods.

Name.	Source.
Sucrose.....	Cane, sugar beet, or maple; the usual form of sugar for household use.
Maltose.....	Sugar found in malted grains.
Lactose.....	Sugar found in milk.
Glucose ¹ (also called dextrose or grape sugar).....	Found in plants, fruits, and honey.
Fructose (also called levulose or fruit sugar).....	Do.
Invert sugar.....	A mixture of equal parts of glucose and fructose formed by the action of heat or acid upon sucrose.
Dextrin—a substance similar to sugar.....	Formed by the action of heat, ferments, or acid on starch; found in toasted bread, browned flour, etc.

¹ Commerical glucose is a preparation made by the action of an acid on starch. It contains a mixture of maltose, glucose, and dextrin. Corn sirup is made of commercial glucose with the addition of some corn or beet sugar to sweeten.

6. Other sources of sweet flavor.—We eat sugar not so much for food value as because we like the flavor. Other sources of sweet flavor may be substituted for a part or all of our sugar.

A. Cereals may be sweetened with dried fruit.

B. Sirups may take the place of sugar in the fruit sauces which must be sweetened. The real apple butter contained only the natural sugar of the apple juice.

C. Simple desserts can be sweetened with sirups of dried fruits.

D. Any craving for sugar or candy can be satisfied with dried-fruit confections. An excessive craving for sweets is unnatural and may indicate an insufficiency in the general diet.

7. Candy consumption:

A. American people have been eating each year in candy alone enough sugar to supply the sugar requirements, under the war-rationing standard, of—

England, for one year.

France, for one year.

Italy, for two years.

B. This large consumption of sugar is neither necessary nor desirable when the candy takes the place of more necessary foods in the diet.

C. It is interesting to note the candies which were prepared during the war emergency from a minimum of sugar and a maximum of other constituents. They are:

(1) Chocolate-coated candies with nut or fruit centers or centers of any creams.

(2) Boiled candies, such as lemon drops, stick candy, fruit tablets, peanut brittle, glacé nuts, sirup taffies, caramels, and kisses.

(3) Marshmallows and similar candies.

(4) Gum drops and jelly beans.

D. The best time to eat candy is very soon after a meal. In no case should it be eaten before a meal. If the candy given children were restricted in amount, kind, and the times of eating it would be a less harmful addition to the diet.

LESSON 1. BRITTLES AND CREAM CANDIES.

AIM.

To show the action of moist and dry heat on granulated sugar.

POINTS TO BE BROUGHT OUT.

1. Food value.—Sugar is a *carbohydrate* which occurs in many of our foods. In granulated sugar we have it in a chemically pure form, and may see the changes brought about in it by the action of moist and dry heat.

2. Action of moist and dry heat upon sugar:

A. When sugar is heated it gives off its water of crystallization and melts, forming first a clear mass which hardens on cooking and is called barley sugar. If the heating is continued, further changes take place, and a substance called caramel is formed. Caramel is used as flavoring.

(1) Brittle candies.—Melt the sugar in an iron pan, stirring constantly with the back of a spoon. If lumps persist place on cool part of stove until the whole mass melts. Pour over nuts in oiled pan with square edges.

(2) Caramel.—Melt small portion of sugar; continue heating until the mass darkens. Add hot water to make sirup and put aside for flavoring. This is especially desirable for flavoring custards and ice creams.

B. When sugar solutions are boiled, the cane sugar (sucrose) is changed into two simpler sugars which do not crystallize so readily. This change takes place slowly, but is hastened by the use of an acid. Advantage is taken of this fact in preparing sirups for table use from cane sugar. If a small amount of acid is added, it will not crystallize on standing. Acid is also used in making candy from sugar.

(1) In cream candies, such as fondant and fudges, enough of the sugar has been changed into simpler sugars to retard crystallization and enable it to be controlled to better advantage. In these, sugar and water and flavoring with or without acid are cooked to the soft ball stage, 113° C. (235° F.). The mixture is then cooled to room temperature, and beaten so as to cause it to crystallize rapidly in small fine crystals, or so-called "cream." Points of caution in making cream candy are:

(a) Time of cooking and amount of acid determine amount of sugar changed, so the amount of acid must be carefully determined.

(b) If not enough sugar is changed the candy tends to grain.

(c) If too much sugar is changed the candy will not cream.

(d) See that all the sugar is dissolved before the solution commences to boil. When any sugar crystals form on the sides wipe them off, since they dissolve with difficulty in the boiling sirup and may make the candy grain.

(e) After cooking, pour out to cool. Do not agitate.

(f) Cool to room temperature before creaming.

(2) Viscous uncrystallized candies, as caramel, taffy, etc., may be made from cane sugar if it is cooked sufficiently long with acid to change so much of the sugar that crystallization is entirely prevented. Points to be remembered in their preparation are:

(a) Be sure to use enough acid.

(b) Avoid unnecessary stirring and agitation.

(3) Texture candies, such as divinity, in which the cane sugar sirup is added to egg white, have the sugar in a creamed form. The same precautions must be observed in their cookery as in the case of the cream candies above. On account of the amount of water in the egg white the sirup is cooked to a greater concentration than for cream candies.

(4) Cake icings made with sirup and egg white are made on the same principles as the texture candies. If the sugar in the sirup is not sufficiently changed or if the proper precautions are not taken in handling, the icing is grainy. If too much sugar is changed in the sirup the icing is sticky and does not harden on top.

METHOD OF DEVELOPING LABORATORY WORK.

Have the women prepare a representative candy from each of the groups. Have recipes brought in for discussion. Classify them on basis of the type of candy.

CHOCOLATE FUDGE.

Sugar, 2 cups.	Chocolate, 2 ounces.
Milk, $\frac{3}{4}$ cup.	Vanilla, 1 teaspoon.
Butter, 1 tablespoon.	

Boil together the sugar, chocolate, and milk until the mixture forms a soft ball, 114° C. (238° F). Remove from the fire and add the butter. Cool and add the vanilla. Stir until the mixture begins to stiffen. Pour into a buttered pan and cut into squares.

PEANUT BRITTLE.

Sugar, 2 cups.	Unroasted peanuts, 1 cup.
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Put peanuts in a buttered shallow pan. Heat sugar slowly over a moderate fire, stirring constantly until it is a golden brown. Pour at once over peanuts in a thin sheet and mark in squares.

FONDANT.

Sugar, 5 cups.	Water, 2½ cups.
Cream of tartar, ½ teaspoon.	

Boil ingredients to the soft ball stage. To prevent crystallization, wipe crystals from the side of the pan as soon as they form. Remove from the fire, let stand until cool, then beat until creamy. Turn out onto marble slab or large platter and knead until soft and velvety in texture. Let stand 24 hours in a covered jar.

DIVINITY.

Sugar, 3 cups.	Water, ½ cup.
Corn sirup, 1 cup.	Chopped nuts, 1 cup.
Whites of 3 eggs.	Vanilla, 1 teaspoon.

Boil sugar, sirup, and water to the crack stage, 127° to 135° C. (260° to 275° F.). Pour over the beaten whites, beating constantly. As it thickens, add the vanilla and nuts. Pour onto a buttered plate and cut into squares or drop from spoon.

SUGAR TAFFY.

Sugar, 3 cups.	Vinegar, ¼ cup.
Water, 1 cup.	Butter, 2 tablespoons.

Boil without stirring to the brittle stage, 132° C. (270° F.). Pour into buttered plates, and when cool enough to handle pull until white and glossy. Add any desired flavoring while pulling. Pull into long thin strips and cut into 1-inch pieces with scissors. Lay on buttered paper.

MRS. WILSON'S DECORATIVE AND PLAIN ICING.¹

Whites of 4 eggs.

Sugar, 2½ cups.

Water, 1 cup.

Lemon juice, 1 teaspoon; or

Baking powder and tartaric acid
mixed, ½ teaspoon.

Cook sirup until it drops thick from spoon. Have whites beaten stiff and smooth with the half cup of sugar. Add sirup to eggs a little at a time, letting the last cook until it threads. After beating well, put over pan of hot water and add powder. Cook until it piles without sinking, to decorate. Plain icing will not require so much cooking. The decorative icing can be beaten back smooth with a spoon. Use lemon if preferred to powder.

LESSON 2. CANDIES MADE FROM SIRUPS.

AIM.

To teach ways of using sirups in the home.

A large amount of sugar reaches the home in the form of sirups. These have formerly been used only in the form of a spread on bread and cakes. During the sugar shortage the production of sirups was stimulated and the supply increased. The production of some of the sirups could easily be increased with little extra outlay and expense and some can be produced more cheaply than cane sugar. We find sirups more desirable for use in certain places than cane sugar. If a steady demand for sirups is created, sirups will appear on the market at lower prices.

POINTS TO BE BROUGHT OUT.

1. Food value, or the composition of the sirup, showing its total sugar content.
2. Comparative sweetness.
3. Substitution value on the basis of weight and composition.

Amount of sirup equivalent to one cup of sugar.

Material.	Water.	One cup (weight in grams).	Solids in 1 cup (weight in grams).	Equivalent of 1 cup of sugar, weight in—	
				Grams.	Cups.
	<i>Per cent.</i>				
Sorghum.....	39	335	234	285	0.85
Honey.....	25	337	252	266	.79
Corn sirup.....	22	332	259	258	.78
Glucose.....	19.5	332	265	250	.75

On this basis, approximately three-fourths cup of sirup will take the place of one cup of sugar. If equal sweetness is desired the

¹ From Mrs. Wilson's New Cook Book.

amount of liquid sweetener must be increased to one cup honey or one and two-thirds cups of corn sirup. This is not economical nor is it desirable, since we habitually use too much sweetening in foods. If sirups are used in recipes where the amount of liquid used is an important factor, decrease the liquid three-eighths cup for every pound or one-fourth cup for every cup of liquid sweetener used.

4. Forms of sugar present in sirups.—The different forms of sugar (see Lesson 1) are combined in varying proportions in the sirups. The table below shows the kind of sugar which is present in the largest amount. The form in which the sugar is present is important in making candies and cake icing.

Sirup.	Forms of sugar present.
Maple.....	Principally sucrose.
Melasses.....	Approximately one-third invert sugar, two-thirds sucrose.
Sorghum.....	Approximately one-third sucrose, two-thirds invert sugar.
Honey.....	Approximately invert sugar.
Commercial glucose.....	Approximately a mixture of glucose, maltose, and dextrin.
Corn sirup	Approximately four-fifths commercial glucose, one-fifth sucrose.

5. Use of sirups in making candy.—We must bear in mind the fact that sucrose must be present in a definite proportion if the candy is to cream. The other sugars retard crystallization and prevent it entirely if used in too large proportion. When invert sugar is added in the form of sirup the acid may be omitted and the cooking time shortened by decreasing the proportion of liquid used.

A. In cream candies, such as fudge, fondant, and divinity, at least three-fourths of the sugar must be in the form of sucrose either dry or in sirup. (Note the sucrose present in maple sirup.) The other sugars retard crystallization.

B. Uncrystallized candies may be made entirely from the sirups. Where sirups have a strong flavor they may be combined with commercial glucose, which has little flavor, or with cane sugar. The only precaution necessary is to be sure that enough invert sugar is added to prevent graining.

C. Cake icing must have as much of the sugar in the form of sucrose as the cream candy. Icing may be prepared from corn sirup or honey, but it remains sticky on the outside.

METHOD OF DEVELOPING LABORATORY WORK.

Demonstrate or have the students prepare fondant from maple sugar or sirup, using proportion of one cup sugar to one-half cup water. If sirup is used, have them calculate the changes necessary in proportion. (See table, this lesson.) If maple sugar is not avail-

able in the community, have students make fudge, using three-fourths cup sugar, one-fourth cup sirup (molasses, sorghum, or glucose), one square chocolate, one-third cup water. Explain that cream candies can not be made entirely from the sirups because sucrose (cane, beet, or maple sugar) must be present if the sugar is to crystallize or cream. Point out that since this type of candy requires a large proportion of sugar it should be least used when sugar is scarce.

Select other candies from the group below, choosing the ones in which the students are most interested and using the sirups available in the community. Where individual laboratory work is done the various kinds should be prepared, allowing ample opportunity for comparison.

PEANUT OR COCONUT BRITTLE.*

Sirup, 1 cup.

Peanuts or coconut, 1 cup.

Boil sirup until it begins to darken. Stir in the nuts, pour on an oiled sheet, and cut into squares.

TAFY.

Sirup, 1 cup.

Butter substitute, 1 tablespoon.

Vinegar, 1 tablespoon.

Flavoring.

Boil until the sirup forms a brittle mass in cold water. Pour on an oiled platter to cool. Pull quickly, incorporating as much air as possible.

HONEY CARAMELS.

(Honey candies are strong in flavor unless the honey is diluted with a flavorless sirup.)

Sirup (honey or honey and light sirup), 1 cup.

Chocolate, 1 square.

1 cup.

Vanilla, $\frac{1}{2}$ teaspoon.

Vinegar, 1 tablespoon.

Butter substitute, 2 tablespoons.

Boil until the sirup will form a firm ball in cold water. Pour into a square-edged pan, cut into squares, and wrap each square separately in oiled paper.

LESSON 3. THE USE OF SIRUPS IN CAKES AND COOKIES.

AIM.

To show the possibilities of substituting sirups for all or part of the sugar in cakes and cookies.

POINTS TO BE BROUGHT OUT.

1. When sirups are used in place of sugar in making cakes, the batter is heavier and requires more baking powder to raise. The texture is not so good as when all sugar is used.

2. In making plain cakes and cookies, where the texture is less important, sirups may take the place of all the sugar. In richer cakes, where the texture is more delicate, one-half the sugar may be replaced by sirup.

3. Sirup should be substituted for sugar in cakes and cookies on the basis of sugar content rather than sweetening power. With the sweeter sirups the product will be sufficiently sweet. With the less sweet sirups, one-half sugar may be used for the flavor. (See table, Lesson 2.)

4. When sirup is used in cakes or cookies, the amount of liquid should be reduced one-fourth cup for every cup of sirup used.

5. Use strong-flavored, dark-colored sirup in spice or chocolate cake, reserving the light or more flavorless sirups for the more delicate cakes.

6. Some of the sirups, such as sorghum or honey, contain organic acids which may be used with soda as a means of leavening the mixture.

7. Dried fruits may be used to furnish a part of the sweetening in cakes and cookies.

METHOD OF DEVELOPING LABORATORY WORK.

Have the students bring in the recipes they are accustomed to use at home, selecting those containing the smaller amount of fat. Let the students change these recipes according to the above suggestions, and have the cakes prepared at home or in the laboratory. The following recipes may be used for supplementary class work. Honey is more expensive than sugar, but the following recipes, which call for honey, may be used in communities where it is practicable. If honey is not available, other sirups or sugar can be used in place of the honey, using amounts given in table in Lesson 2.

SORGHUM GINGERBREAD.

Sorghum, 1 cup.	Baking powder, 1 teaspoon.
Fat, $\frac{1}{4}$ cup.	Ginger, $1\frac{1}{2}$ teaspoons.
Flour, $2\frac{1}{2}$ cups.	Cinnamon, 2 teaspoons.
Sour milk ¹ 1 cup.	Allspice, 1 teaspoon.
Soda, 1 teaspoon.	

TEA CAKES.

Flour, 2 cups.	Raisins, 1 cup.
Fat, $\frac{1}{4}$ cup.	Sirup, $\frac{2}{3}$ cup.
Baking powder, $1\frac{1}{2}$ teaspoons.	1 egg.
Milk or water, $\frac{2}{3}$ cup.	

Bake in muffin rings in a medium oven.

¹ Sweet milk may be used for sour milk by using $\frac{1}{2}$ teaspoon soda and 2 teaspoons baking powder.

BUTTER HONEY CAKES.

Honey, $1\frac{1}{2}$ cups.	Soda, $1\frac{1}{2}$ teaspoons.
Butter, $\frac{1}{2}$ cup.	3 eggs.
Flour, 5 cups.	Cinnamon, 2 teaspoons.
Salt, $\frac{1}{2}$ teaspoon.	
Orange-flower water, 2 tablespoons.	
(Water may be substituted.)	

Rub together the honey and butter; add the unbeaten yolks and beat thoroughly. Add the flour sifted with the cinnamon and salt, and the soda dissolved in the orange-flower water. Beat the mixture thoroughly and add the well-beaten whites of the eggs. Bake in shallow tins and cover with frosting made as follows:

ORANGE FROSTING FOR BUTTER HONEY CAKE.

Grated rind 1 orange.	1 egg yolk.
Lemon juice, 1 teaspoon.	Confectioners' sugar.
Orange juice, 1 tablespoon.	

Mix all the ingredients but the sugar and allow the mixture to stand for an hour. Strain and add confectioners' sugar until the frosting is sufficiently thick to be spread on the cake.

HONEY SPONGE CAKE.

Sugar, $\frac{1}{2}$ cup.	4 eggs.
Honey, $\frac{1}{2}$ cup.	Flour, 1 cup.

Mix the sugar and honey and boil until the sirup will spin a thread when dropped from the spoon. Pour the sirup over the yolks of the eggs, which have been beaten until light. Beat this mixture until cold; add the flour and cut and fold the beaten egg whites into the mixture. Bake for 40 or 50 minutes in a pan lined with buttered paper in a slow oven.

HONEY POUND CAKE.

A good pound cake can be made by using equal weights of honey, sugar, eggs, flour, and butter. A little soda should be added because of the acidity of the honey, and a good flavoring is cardamom seed and orange-flower water. Or a cake similar to pound cake may be made as follows:

Sugar, 1 cup.	Powdered cardamom seed, $\frac{1}{2}$ teaspoon.
Honey, $\frac{3}{4}$ cup.	Orange-flower water, $\frac{1}{2}$ teaspoon.
Butter, 1 cup.	Soda, $\frac{1}{2}$ teaspoon.
Pastry flour, 2 cups.	4 eggs.

Rub together the butter and sugar and add the honey. Add the well-beaten yolks of eggs. Finally add the egg whites, beaten to a stiff froth, and the orange-flower water. Add gradually the flour, sifted with the soda and cardamom seed. Beat the mixture 10 minutes. Put the dough into a warm tin with high sides and bake one hour in a slow oven.

HONEY FRUIT CAKE.

Honey, $3\frac{1}{2}$ cups.	Vanilla, 2 teaspoons.
Butter, 1 cup.	Seeded raisins, 3 pounds.
Flour, 3 cups.	Currants, $1\frac{1}{2}$ pounds.
6 eggs.	Citron, 1 pound.
Soda, 2 teaspoons.	Candied cherries, 1 pound.
Cinnamon, 2 teaspoons.	Candied apricots, 1 pound.
Sour jelly or white grape juice, $\frac{1}{2}$ cup.	Candied pineapple, 1 pound.
Ginger, 2 teaspoons.	Candied orange peel, 2 ounces.
Ground cardamom seed, 3 teaspoons.	Candied lemon peel, 2 ounces.
Cloves, $\frac{1}{2}$ teaspoon.	

Cut all the candied fruit except the cherries into small pieces. Place the fruit in a large dish and sift over it one-half the flour, mixing thoroughly. Sift the soda with the remaining flour. Bring the honey and the butter to the boiling point and while still hot add the spices. When the mixture is cool, add the well-beaten yolks of the eggs, then the flour and grape juice or jelly, and the well-beaten whites. Finally, add the fruit. Divide dough into three or four parts and put into buttered tins covered with buttered paper tied loosely over the top. Steam for five hours, remove the paper, and bake in a very slow oven for an hour.

HONEY COOKIES.

Honey, $\frac{2}{3}$ cup.	Cloves, 1 teaspoon.
Sugar, $\frac{2}{3}$ cup.	Soda, $\frac{1}{2}$ teaspoon.
Flour, $2\frac{1}{2}$ cups.	Cinnamon, $1\frac{1}{2}$ teaspoons.
Walnut meats, finely chopped, $\frac{1}{4}$ pound.	Cloves, 1 teaspoon.
Candied orange peel, finely chopped, 2 ounces.	Allspice, 1 teaspoon.

Sift together the flour, spices, soda, and add the other ingredients. Knead thoroughly, roll out thin, and cut with a biscuit cutter. These cookies are very hard.

LESSON 4. GELATIN DESSERTS.

AIM.

To teach the use of gelatin in the preparation of desserts.

POINTS TO BE BROUGHT OUT.

1. Gelatin is a protein which dissolves in hot water and sets on cooling to form a clear jelly-like mass. The amount of gelatin required in order to have the solution set is so small that it in itself is negligible in food value. It is of value, in that it furnishes an attractive way of serving other food ingredients. The food value of the gelatin desserts depends mainly upon the ingredients added.

2. Forms in which obtained:

A. Sheet gelatin is prepared in very thin sheets, which dissolve readily if stirred in water at boiling temperature. This is sold in pound packages and is the cheapest form available. It is not often

used by the housewife, for she finds the small measured trade packages more convenient.

B. Granulated or pulverized gelatins are usually sold in packages measured so as to contain the amount necessary to thicken a quart of liquid. These dissolve very readily in hot water after soaking in cold.

C. Acidulated gelatins are sometimes sold. In these a powdered acid is combined with the gelatin and serves to flavor it. Such gelatins are never as desirable, from point of view of flavor or dietetic value, as those flavored with natural fruit juices, and are especially to be avoided with any of the desserts using milk since the acid causes the milk to curdle.

3. Typical gelatin desserts:

A. *Plain gelatin* is made from water sweetened and flavored with fruit juice, with enough gelatin added to set the mixture.

B. *Snow* is a plain gelatin, to which well-beaten egg white is added just before it sets to give a spongy texture to the mixture.

C. *Spanish cream* is a custard set with gelatin, to which beaten egg white is added to give a spongy texture.

D. *Bavarian cream* is a custard mixture set with gelatin, to which whipped cream is added.

E. *Charlotte russe* is a cream mixture set with gelatin, to which is added whipped cream or whipped cream and beaten egg white.

4. Method of combining:

NOTE.—The proportion of gelatin to liquid varies under different conditions. In general, the following proportions are used:

Gelatin:	Liquid:
1 ounce.	1½ to 2 quarts water.
1½ ounces.	1½ to 2 quarts in hot milk.
1½ ounces.	1½ to 2 quarts if fruit, vegetables, or nuts are used.

A. Soak the gelatin in cold water. If sheet gelatin is used, it may be added directly to the hot liquid.

B. Prepare the liquid, sweeten, but do not flavor. Heat and pour over the soaked gelatin. Be sure that the combined liquid plus any added for flavor or to be combined after beating is taken into account in estimating the amount of gelatin to be used.

C. When the gelatin is completely dissolved and the solution commences to cool add the flavor.

D. Molding with fruit. If the gelatin is to be molded with fruit place dish on ice and pour in layer of gelatin. Place the remainder in a warm place so it will not harden before needed. When the first layer has hardened arrange fruit on it and pour on another layer of gelatin. Continue until the dish is filled.

E. If used, whipped cream or beaten egg white should be added just before the gelatin sets and as it starts to thicken. If added too soon it rises to the top and the dessert hardens in two layers. If added too late there is not a complete mixture and lumps of gelatin are distributed through the spongy texture.

F. In order to set or congeal, gelatin desserts need to be thoroughly chilled. Placing on ice or in a cool place is sufficient if there is plenty of time. If the time available is short the setting is hastened by the use of ice and salt.

METHOD OF DEVELOPING LABORATORY WORK.

Have one of each of the above desserts prepared showing the great variety possible. These may be prepared in family quantities and taken home for use.

Calculate the cost and compare with some prepared gelatin dessert as to cost and palatability.

LEMON JELLY.

Gelatin, 1 tablespoon.

Sugar, $\frac{1}{2}$ cup.

Water, $1\frac{1}{2}$ cups.

Lemon juice, 3 tablespoons.

Salt.

Soak gelatin in 4 tablespoons of the measured water; heat the remainder of the water; add sugar and pour over the dissolved gelatin. Add the flavoring and salt and cool.

PINEAPPLE SNOW.

Gelatin, $\frac{1}{2}$ box.

Cold water, 1 scant cup.

1 small pineapple, grated.

Sugar, 1 cup.

Cream, 1 pint.

Soak gelatin in the water one hour. Cover grated pineapple with the sugar and let stand one hour; then stir the soaked gelatin into it. Turn into a saucepan set in a pan of boiling water and stir until the gelatin and sugar are dissolved. Let cool but not stiffen. Whip the cream very stiff, stand the saucepan containing the gelatin and pineapple mixture in a deep bowl of cracked ice, and as it stiffens slowly beat into it the whipped cream. Beat steadily until the cream is used and the jelly is white and stiff. Mold and place on ice. Serve with rich cream.

CARAMEL SPANISH CREAM.

Gelatin, 1 tablespoon.

Sugar, $\frac{1}{2}$ cup.

Milk, 2 cups.

2 eggs.

Vanilla, $\frac{3}{4}$ teaspoon.

Scald the milk. Brown the sugar and dissolve in hot milk. Make custard of milk, sugar, egg yolks, and salt. Remove from fire, add gelatin, and when dissolved stir in the stiffly-beaten whites. Flavor and pour into wet, cold molds.

ORANGE BAVARIAN CREAM.

$\frac{1}{2}$ lemon, grated rind and juice.	2 eggs.
Orange juice, $\frac{1}{2}$ cup.	Granulated gelatin, 1 teaspoon.
Sugar, $\frac{1}{3}$ cup.	Cold water, 1 tablespoon.

Mix sugar, yolks of eggs, lemon, and orange juice. Stir vigorously over the fire until it thickens, add soaked gelatin, then pour over stiffly-beaten whites of eggs. Set in pan of ice water and beat until thick enough to hold its shape. Turn into molds and chill.

CHARLOTTE RUSSE.

Gelatin, 2 tablespoons.	Cream, 1 cup.
Sugar, $\frac{2}{3}$ cup.	Flavoring, 1 teaspoon.
Milk, 2 cups.	Lady fingers or sponge cake.

Soak gelatin in 8 tablespoons of the measured milk. Scald the remainder of the milk and add the sugar. Pour over the soaked gelatin. Strain and set in ice water. Add flavoring. Stir until it begins to thicken and add the cream, whipped stiff. Line the mold with lady fingers or thin strips of sponge cake and pour mixture into them.

FRUIT JELLY.

Gelatin, 1 tablespoon.	Vanilla, 1 tablespoon.
Sugar, $\frac{1}{2}$ cup.	Salt.
Fruit juice and finely-cut fruit, 2 cups.	

Soak gelatin in 4 tablespoons of measured fruit juice. Heat the remainder of the liquid; add sugar and pour over soaked gelatin. Add salt and flavoring. Pour into wet, cold molds.

LESSON 5. WATER ICES.

AIM.

To teach the method of preparation of water ices and their use in the diet.

POINTS TO BE BROUGHT OUT.

1. Water ices are frozen solutions of sugar and fruit juices in water. (Unless fruit juice used is acid, lemon juice should be added to bring out flavor.) Other materials may be added to change the texture. These may be:

A. Gelatin.—This is dissolved in the sirup. The amount used is small, one-fourth ounce envelope to quart. The purpose of adding the gelatin is both to increase the body of the ice and to prevent crystallization on standing.

B. Egg white.—These are used in varying proportions, one or more to a quart. They increase the richness and food value of the ice. The egg white is beaten stiff and added when the ice is partially frozen.

C. Milk.—This may be used instead of a portion of the water. In this case the sugar and fruit juice are added to the water and when the mixture is partially frozen the milk is added. At this low temperature a soft flocculent curd is formed which is distributed throughout the ice and increases the body, food value, and flavor.

2. Use of water ices:

A. Their food value is not high but they furnish a very palatable way of introducing fruit juices into the diet.

B. The acid flavor and the coldness make them especially refreshing. They are usually used—

(1) As a dessert after a hot, heavy meal.

(2) With meat courses where their acid coldness makes a desirable contrast. In this case plain acid water ices should be used since high food value is not desirable and a granular consistency is not objectionable.

3. Method of preparation:

A. Make a sirup of the sugar to be used and a portion of the water. This gives a smoother consistency to the ice. Sirups instead of sugar may be used to sweeten in case the flavor is not objectionable. If gelatin is used, it is added to the hot sirup.

B. Cool sirup before adding fruit juices, since heating fruit juices destroys their delicate flavor. Some acid juices, as lemon or lime, are desirable in all ices. It forms a good background for the other fruit flavors. The grated rind of lemon or orange helps bring out a distinctive flavor. The fruit pulp may be added. The flavor should be more decided than is wanted in the frozen ice for the frozen product numbs the taste buds so they do not distinguish flavors so acutely. Tea added gives distinctive flavor.

C. Freeze as directed in lesson on "The Use of Milk and Cream in Frozen Desserts." (Unit IV, Lesson 4.) The more rapidly the freezer is turned the smoother the consistency of the ice.

METHOD OF DEVELOPING LABORATORY WORK.

Have typical ices prepared and served. Calculate the cost and compare with those bought as to cost and flavor.

LEMON ICE.

Water, 4 cups.

Juice of 6 lemons.

Sugar, 2 cups.

Boil sugar and water 20 minutes. Add juice of lemons, strain and freeze.

ORANGE ICE.

Use recipe for lemon ice, substituting 2 cups of orange juice for 4 of the lemons.

STRAWBERRY ICE.

Water, 4 cups.

Strawberry juice, 2 cups.

Sugar, $1\frac{1}{2}$ cups.

Lemon juice, 1 tablespoon.

Make a sirup as for lemon ice. Cool, add strawberries mashed and squeezed through double cheese cloth, add lemon juice. Strain and freeze.

PEACH ICE.

Use recipe for strawberry ice, substituting 2 cups of peach juice and pulp made from soft, ripe, fresh peaches for the strawberry juice.

APRICOT ICE.

Same as peach ice.

WATERMELON ICE.

Chop watermelon very fine; add sugar or sirup and lemon juice to taste; freeze.

REFERENCES.

U. S. Department of Agriculture:

Farmers' Bulletin 653. Honey and Its Uses in the Home.

Farmers' Bulletin 535. Sugar and Its Value as Food.

U. S. Food Administration (see note at end of Lesson 6, Unit II):

Desserts for 100 Using Little Sugar.

Frozen Desserts.

War Confections.

UNIT IX.

Home Preservation of Food.

GENERAL INFORMATION.

1. Preservation of food is important because:

A. It provides a method of equalizing the food supply from season to season or from year to year, and thereby helps to stabilize prices.

B. It makes it possible to transport foods more easily for long distances so that the surplus products of one locality may be used to supply other localities where there is a shortage.

C. It provides a more varied, healthful, and appetizing diet. The increased use of fresh and canned fruits and vegetables during the winter months does away with the need for a spring tonic. Many cases of undernourishment or disease may be traced to a too restricted diet.

D. It prevents waste of perishable foods by providing a method by which they may be kept for future use.

2. Reasons why food spoils.—Everywhere, in the air, soil, and water, and on everything we use, there exist tiny plants or organisms, known as bacteria, yeasts, and molds, which are so small that they can be seen only with a microscope. For this reason they are often called microorganisms. When these organisms are allowed to grow in or on food they cause spoilage. If they can be destroyed, and otherwise prevented from attacking the food, it will keep indefinitely. Some forms of organisms are easily destroyed, others form spores which are more resistant, and therefore are more difficult to destroy.

3. How food spoilage can be prevented.—The spoilage of food can be prevented by destroying the organisms or preventing their activity, by means of:

A. Cold, as in refrigeration or cold storage.

B. Heat, as in canning.

C. Removal of moisture, as in drying.

D. Adding "preservatives" or substances in which organisms can not grow. Sugar, salt, spices, and vinegar are household preservatives.

4. Choice of method of food preservation for the home.—Whether food should be canned, dried, salted, fermented, or otherwise stored depends upon:

A. The equipment available.

B. The family preference.

C. The kind and amount of food to be kept.

D. Storage space available.

E. Kind of containers which may be procured.

5. Community canners and driers should be encouraged wherever there are enough locally grown products to justify their installation. Any community surplus of perishable foods may thus be saved. Good equipment and expert advice can thus be furnished to all the women in the community at a small cost, a more standard product may be obtained, and the chance of spoilage lessened.

6. In addition to observing the directions for proper sealing and sterilization in canning foods (Lesson 1), these simple precautions should be observed in their use to obviate any possible dangers arising from spoilage.

A. Boil all vegetables five minutes before serving. If they are to be used for salad allow time for them to cool.

B. Boil fruit for five minutes, also, and cool before serving.

C. Fermentation causes a change in flavor, which is objectionable to many people, but it does not make the food unfit for use. Canned fruit or vegetables which have fermented may be used provided they are first thoroughly boiled.

D. Do not use canned fruit or vegetables which have a "flat, sour" taste due to changes which are produced by organisms forming acids but no gas.

LESSON 1. THE CANNING OF FRUIT.

AIM.

To give methods by which fruit may be canned successfully at home.

POINTS TO BE BROUGHT OUT.

1. Reasons for canning fruit:

A. Fruit contains acids which partially prevent the rapid growth of organisms, hence canning furnishes an easy method of providing a supply for use when needed.

B. Fruit is extremely important in the diet on account of its acids and its mineral matter. It also adds bulk to the diet. (See Unit II, Lesson 1.) The high price of fresh fruit out of season discourages its general use. Fruit canned in season not only saves perishable products that would otherwise go to waste, but furnishes economical, palatable, and satisfactory substitutes for fresh fruit in the diet during the time of year when this is high in price.

2. Review the reasons why foods spoil and methods of controlling food spoilage. (See introduction.)

A. Canning is a method of preservation by heat in which the food is heated to a sufficiently high temperature and for a sufficient length of time to kill all organisms present and then sealed so that no more can enter. Foods so treated will keep indefinitely.

3. Methods of canning fruit:

A. Open-kettle method.—By this method food is cooked in an open kettle the required time, transferred immediately to a sterilized jar, and sealed. Jars, tops, rubbers, and all utensils must be thoroughly sterilized before being used.

(1) Advantages:

(a) Requires little time and simple equipment which may be found in any kitchen. The direct application of heat enables the boiling temperature to be reached quickly and maintained throughout the food as long as is necessary for complete sterilization.

(b) By this method the product may be concentrated to any desired degree before being canned. This is important where jar-space is valuable.

(2) Disadvantages:

(a) Unless all utensils used are completely sterilized, and unless the work is carefully done and the sealing accomplished while the product is as near the boiling point as possible, organisms may enter the jar when it is being filled, and the product thereby be spoiled.

(b) Many fruits and vegetables canned by this method do not retain their color and shape so well as those canned by the can-cooked process, but in some cases more of their original food value may be preserved.

(3) Products for which this method is suited:

(a) May be used for any product which is easily canned or for those products which require concentration before being canned.

(b) It should not be used for canning foods high in protein unless the food is later sterilized in the jar.

B. Can-cooked method.—By this method the food is packed into the jar and both jar and contents are sterilized at the same time in hot water or steam. Since fruits are sterilized by cooking at boiling temperature; they may be canned satisfactorily by a one-period cooking in a hot-water bath. The use of a pressure cooker shortens the time required, but is not necessary to keep the fruit. Where a certain consistency or flavor is desired, as in the case of such products as fruit sauces, baked fruits, watery vegetables, and some meats, the food is precooked, as for the table before being packed into the jar and sterilized by the can-cooked method.

(1) Advantages of the can-cooked method:

(a) It may be used for any fruit, vegetable, or meat.

(b) It offers less opportunity for spoilage, since the jars are not opened after the fruit is sterilized, and both can and contents are sterilized with the one heating.

(c) It produces a more uniform product, which retains its color and shape better than products of the open-kettle method.

(d) In general it is an easier method of canning than the open-kettle method, because it requires less handling of hot materials and utensils.

(2) Disadvantages:

(a) With some products a preliminary process, called blanching, is used to shrink the product and help to set the color. This increases the handling and the labor necessary and causes some loss of food value.

(b) This method does not permit concentration unless precooking is used also, hence with watery products the material should be concentrated before packing in the jars.

(c) The product heats more slowly, and if closely packed it takes a longer time for the amount of heat necessary for sterilization to penetrate throughout the material.

(d) It requires additional equipment for processing, or sterilizing. This may be purchased or improvised from utensils on hand.

(3) Products for which the method is suited:

(a) Products requiring a long period of sterilization or a temperature higher than boiling.

(b) Used as a method of sterilizing such precooked products as fruit, sauces, or for preserves, jams, or butters, where the amount of sugar has been reduced to a minimum.

(4) Equipment needed for can-cooked method:

(a) Glass jars and tin cans.—Any type may be used which provide for an air-tight seal.

(b) Tops.—Glass tops may be used from year to year. Metal tops should be purchased new each year. Test all tops before using to see that they fit the jars.

(c) Rubbers.—Use only heavy, new, elastic rubbers. Test by stretching to see that they spring back into place readily, or by bending the edge sharply, to see if the rubber breaks or comes into tiny holes. See that the rubber fits the jar.

(d) Wire basket or squares of cheesecloth for blanching.

(e) Pans, knives, spoons, kettle for sirup, etc.

(f) Canner:

(1) Homemade, water-bath canner.—Any vessel may be used, such as washboiler, lard can, or tin pail, with a closely fitting top, and a false bottom of strips of wood or wire which will raise the jars an inch above the bottom of the canner and let the water circulate beneath. Tin cans are submerged in the water in the canner, but when glass jars are used either of the following methods is successful: (a) Have the water come at least an inch above the jars when they are on the rack, or (b) have the water come to 1 or 2 inches below the top of the jars. This type of canner is inexpensive and satisfactory. Commercial water-bath canners may be obtained, if preferred.

(2) Steam-pressure canner.—A commercial canner with a steam-tight lid and a pressure gauge. The high temperature which may be maintained shortens the time of sterilization. Such canners are more expensive but are suited to conditions where a great deal of canning is to be done, to climates where the higher temperature is necessary to keep products successfully, or the altitude lowers the boiling point.

(5) Steps in can-cooked method:

(a) Select only fresh, sound fruits.

(b) Clean and prepare by paring, cutting into suitable pieces, etc.

(c) Hard fruits, such as apples, pears, or quinces, may be blanched by being dipped in boiling water or placed in live steam, the length of time given in the table. This shrinks the product and enables more to be packed into the jar, but loses something of the flavor and food value. Juicy or soft fruits should never be blanched except as a short, hot dip may be an advantage in removing the skin.

(d) After blanching, dip into cold water to set the color and cool the product for handling.

(e) Pack immediately into hot, clean jars, or cans.

(f) Fill jar or can with boiling water, sirup, or fruit juice. (See 6.)

(g) Adjust tops or exhaust air.

(1) Glass jars.—Adjust rubbers and tops. Partially seal. Glass-top jars have the upper clamp adjusted and the lower spring left up. Screw-top jars are sealed, then turned slightly to the left to loosen. Composition-top jars have the lids put on and the spring adjusted.

(2) Tin cans.—Fill cans and cap, leaving the small opening in the center of the can open. Place in hot-water bath and heat to boiling to exhaust air from the can. Seal the opening while can is steaming hot.

(h) Sterilize or process.—Place jars in canner and sterilize the required length of time. Count time only when water is boiling hard or steam is at the required pressure.

(i) Remove jars, tighten tops, and cool.

There are two variations of the above process in use, one in the North and West and one in the South. For detailed directions for these processes the following bulletins should be consulted:

United States Department of Agriculture, States Relation Service:

Farmers' Bulletin 839. Home Canning by the One-Period Cold-Pack Method.

Farmers' Bulletin 853. Home Canning of Fruits and Vegetables as taught to Canning Club Members in the Southern States.

(6) Use of sugar and sirups in canning fruit.—In the usual method of canning fruit, sugar is used for flavor and to help keep the fruit in shape. When sirup is mentioned in canning directions, it refers to sugar and water, brought to the boiling point. The proportions used vary according to taste from a thin sirup (about one cup sugar to four cups water) used for sweet fruits, to a thick sirup (about one cup sugar to two cups water) for sour fruits.

Table of proportions for sirups.

[Circular No. A-81.—States Relations Service, U. S. Department of Agriculture.]

Sirup.	Sugar.	Water or fruit juice.
No. 1.....	14 ounces.....	1 gallon.
No. 2.....	1 pound 14 ounces.....	Do.
No. 3.....	3 pounds 9 ounces.....	Do.
No. 4.....	5 pounds 8 ounces.....	Do.
No. 5.....	6 pounds 13 ounces.....	Do.

It is an improvement in flavor and food value if fruit juice is used instead of water in making the sirup. If the use of sugar is not desired, fruit may be canned in any of the following ways:

(a) Fruit may be canned unsweetened by adding hot water instead of sirup. Such fruit will not hold its shape so well, but is suitable for pies, puddings, or salads. Add 10 minutes to time of sterilization.

(b) Fruit may be canned in fruit juice with no sugar instead of in sirup. Apple juice, grape juice, or juice made

from small or imperfect fruits may be used. Such fruit holds its shape and has its natural fruit flavor increased.

(c) Other sweeteners, such as corn sirup, glucose, honey, maple sirup, molasses, and sorghum may be used in place of part or all of the sugar in canning. Molasses and sorghum give a characteristic flavor and are best used with very acid fruits. In the above proportions other sweeteners take the place of 75 per cent of the sugar.

(d) Fruit may be canned with the addition of only as much sugar as would be used were it served fresh. Mix and allow to stand to draw out juice. Pack in can, using juice to cover.

METHOD OF DEVELOPING LABORATORY WORK.

Where laboratory facilities are not available for class work this lesson may be given as a demonstration by the teacher. One hard fruit, such as apples or pears, and one soft fruit, such as berries, may be canned. Suggest the possibility of canning such fruits as green apple sauce, baked peaches, apples or pears, rhubarb sauce or baked rhubarb by precooking and then sterilizing by the can-cooked method.

Where sufficient laboratory equipment is available the lesson should be used as a class practice. It might be well to put into the hands of each member of the class a copy of either of the bulletins named in (5) and have the work done according to the directions contained in the bulletin. Different students or groups of students should use the methods suggested in (6) and compare the products as to flavor and texture. In class practice in canning, carefulness, cleanliness, and speed should be emphasized.

If the students prefer they may be allowed to bring from home any fruit which they wish canned, use this in the class practice, and take the finished product home. In this case all materials as well as jars, rubbers, and lids will be furnished by the students.

Supplementary home work may be assigned to the students by requiring them to can a jar of fruit at home and bring it to class for display and criticism. Opportunity should be given at this time for discussing any difficulties that arise in the home canning and for suggesting ways of solving these difficulties.

LESSON 2. THE CANNING OF VEGETABLES.

AIM.

To encourage the increased home canning of vegetables from the standpoint of value in the diet, economy and conservation, and to give methods by which home canning of vegetables may be done successfully.

POINTS TO BE BROUGHT OUT.

1. The amount of vegetables canned at home is smaller than that of fruit, and people rely more on the commercial products. Home-canned vegetables are frequently superior in flavor and quality and are less expensive than the commercial article.

2. It is estimated that the average family needs daily a can of fruit or vegetables or the equivalent in fresh fruits and vegetables for the sake of health and variety of diet. Canning makes it possible for every family to have the necessary amount of vegetables during the months when fresh vegetables are high in price or are not obtainable.

3. Special emphasis should be laid on canning the perishable vegetables, such as greens, asparagus, green beans, etc. It is not necessary or economical to can such vegetables as turnips or cabbage which can be otherwise stored and used fresh.

4. Method to be used.—Vegetables are more difficult to can than fruit, because they have less acid and because some types are attacked by spore-forming bacteria, which require long boiling or a high temperature for sterilization. With care, however, vegetables can be canned successfully in the home. The following methods are used:

A. Open-kettle method may be used satisfactorily for a few acid vegetables such as tomatoes.

B. In general, the can-cooked method is recommended as being more certain and better adapted to the longer period of sterilization which is required.

C. For watery vegetables, such as greens, it is an advantage to cook first in an open kettle to reduce the bulk, then sterilize by the can-cooked method. The liquid from the vegetables should be used in filling the jars. The same result may be accomplished by blanching but with a loss of mineral salts.

5. Methods of processing can-cooked vegetables:

A. One-period process in the water-bath canner, such as is given for fruit (Lesson 1). This is an easy and convenient method. In the case of closely packed vegetables, or the vegetables, such as peas, beans, or corn, which are more difficult to can, a long period of processing is necessary in order to obtain sufficient heat throughout the jar for complete sterilization.

B. Intermittent process requires a period of sterilization (usually one hour or more) on three successive days. This method is more sure for canning the vegetables which are high in spore-forming bacteria. When this method is used care should be taken that the time employed is sufficiently long for the interior to reach the

temperature required to kill the bacteria. Either this method or processing under pressure must be used in Southern States to insure success in canning vegetables.

C. Processing under pressure is sure and is especially satisfactory for the more difficult vegetables. The use of too high a temperature should be avoided since it will injure the flavor and the appearance of the vegetable.

6. Steps in canning vegetables.—Follow directions in Lesson 1 for canning fruit, using boiling water instead of sirup to fill the jars and adding a level teaspoonful of salt to each quart of vegetables.

7. Special directions for canning vegetables:

A. If green vegetables are blanched in live steam instead of in boiling water, more of the flavor and mineral matter will be retained.

B. Tomatoes should be packed closely in the jars, and tomato juice (from small or imperfect tomatoes) added instead of water.

C. All vegetables should be canned within five or six hours after being gathered. To obtain a well-flavored product, work quickly with a small quantity at a time and place each jar in the canner as it is filled.

D. Corn should be blanched and cold dipped before being cut from the cob. In packing corn, Lima beans, or mature green beans leave space for expansion at the top of the jar.

E. When blanching beets leave on an inch of top and all the root. Cold dip and scrape gently to remove skin. Avoid cutting if beets are to retain their color.

F. Combinations of vegetables may be canned for soups or salads by blanching each vegetable separately, then packing and sterilizing according to the vegetables which require the longest time, or by cooking in small amount of water to shrink and canning, without blanching, in proportions for soup.

METHOD OF DEVELOPING LABORATORY WORK.

This lesson may be used as a demonstration by the teacher or as a class practice, as suggested for Lesson 1, with the use of the same bulletins. Tomatoes, a green vegetable, and one vegetable such as peas, beans, or corn, should be canned. Care, cleanliness, speed, and skill should be emphasized. Get an estimate from each student as to what vegetables are commonly canned in their homes and in what quantity and what commercially canned vegetables are bought. Encourage the home canning of a variety of vegetables in sufficient quantity to take the place of the commercial product. If possible have the laboratory work done in quantity.

Point out the usual causes of failure in canning vegetables and see that the students learn how to avoid these. The most frequent causes of failure are:

1. The use of vegetables of a poor quality or those that have stood too long after being gathered.
2. The use of poor lids and rubbers.
3. Failure to keep the water boiling hard during the period of blanching and sterilization.
4. Failure to work quickly and with such a quantity that the vegetables do not deteriorate with long standing in a hot kitchen.
5. Failure to sterilize for sufficient length of time.

The students may bring vegetables from home and can them in class as suggested in Lesson 1. Supplementary home work may consist of having each student can any available vegetables at home and bring them to class, or having each student agree to help a neighbor can vegetables and report her success. In either case there should be a class discussion of any difficulties met and suggestions given for overcoming these difficulties.

LESSON 3. FRUIT JUICES.

AIM.

To show the value of fruit juices in the diet, to give methods of extracting and bottling the juices, and to suggest ways in which they may be used.

POINTS TO BE BROUGHT OUT.

1. Value in the diet:

A. Fruit juices contain a large part of the acid, sugar, mineral matter, and water of the original fruit. They are therefore valuable additions to the diet and should be used generously. (See Unit II, Lesson 1.)

B. Fruit juices offer a method for using small or imperfect fruits unsuited to canning or other methods of preservation.

C. Concentrated fruit juices contain a fairly large proportion of fruit sugar and may be used as sugar savers.

2. Methods of extraction:

A. Cold.—Juicy or very soft fruits may be mashed and run through a fruit press or strained through a jelly bag, then heated and bottled as described below.

B. Hot.—Cook fruit in a small amount of water until reduced to a pulp and strain. Hard fruits will require more water and may be cut into pieces before being cooked.

3. Method of obtaining clear juice.—If a clear juice is desired it should be placed in a glass or enameled vessel and allowed to settle for 24 hours before bottling. Pour off carefully or siphon off so as not to disturb the sediment. Juice extracted by the cold process should be heated to the simmering point before being set aside to settle.

4. Methods of canning or bottling:

A. Heat juice to boiling point, pour into sterilized bottles, and seal with corks. Dip cork and neck into melted paraffin. Glass jars may be used instead of bottles and the juices sealed as in canning fruit.

B. Pour the juice into the bottles, cork with cotton, place bottles in hot water up to the neck and sterilize for 40 minutes at a temperature of 74° C. (165° F.). Remove the bottles and press the cork in over the cotton. Seal with paraffin if necessary.

5. Suggested uses:

A. As a beverage. Several fruit juices may be combined for this purpose.

B. As a sauce for puddings.

C. As a flavoring for puddings, pies, or custards.

D. In ices or ice creams.

E. In gelatin desserts.

F. On waffles or griddle cakes.

G. As a basis for cooked dressing for fruit salad.

H. For jelly to be made at a later period. (For this purpose only juice extracted with heat should be used because pectin is not present in a cold extract.)

METHOD OF DEVELOPING LABORATORY WORK.

Fruit juice should be prepared from any fruit in season, showing both methods of extraction. Compare the two extractions for (*a*) amount of juice, (*b*) concentration, and (*c*) flavor. The juice extracted by heat should be bottled for use in the lesson on jelly making. The juice extracted by the cold process may be used for demonstrating any of the following recipes:

FRUIT BEVERAGE.

Any desired combination of fruit juices may be used, and water added according to the strength desired for the beverage. In sweetening with sugar, it is more economical to make the sugar into a sirup before adding to the fruit juice. With mild fruit juices, a small amount of lemon juice improves the flavor. Average proportions for a fruit drink are:

Sugar, $\frac{1}{4}$ cup (or the equivalent in sirup).	Lemon juice, $\frac{1}{4}$ cup.
Water, $1\frac{1}{2}$ cups.	Raspberry, loganberry, or other fruit juice, 1 cup.

FRUIT PUNCH.

Strawberry, raspberry, loganberry, or grape juice, 1 cup.	Strong tea, $\frac{1}{2}$ cup.
Juice of 2 oranges.	Sugar (or the equivalent in sirup), 1 cup.
Juice of 3 lemons.	Water, 1 quart.
Grated pineapple, $\frac{1}{2}$ can.	

GRAPE SPONGE.

Granulated gelatin, 2 tablespoons.	Sugar (or the equivalent in sirup), $\frac{3}{4}$ cup.
Grape juice, 1 cup.	Two egg whites.
Lemon juice, $\frac{1}{4}$ cup.	
Boiling water, 1 cup.	

Soften the gelatin in $\frac{1}{4}$ cup of cold water. Add the boiling water and the sugar or sirup. When partially cooled add the grape and lemon juice. Fold in the beaten egg whites just when the mixture begins to set.

STRAWBERRY BAVARIAN CREAM.

Make as for grape sponge, using strawberry juice for grape juice. Omit the egg whites and use instead 1 cup cream, whipped. Fold in just when the mixture begins to set.

LESSON 4. JELLY MAKING.

AIM.

To show how to convert fruit juices into a firm, tender, palatable jelly, using a minimum amount of sugar.

POINTS TO BE BROUGHT OUT.

1. Jelly making is not an economical method of using fruit or sugar, when the time, fuel, and amount of fruit and sugar required are taken into consideration. It is, however, a good method by which cores, parings, or small and imperfect fruit may be converted into an appetizing product.

2. Selection of fruit for jelly making:

A. In order to make a good jelly, fruit must contain acid and a jelly-making substance called *pectin*.

B. Underripe and tart fruits contain a larger amount of these ingredients and are best for jelly.

C. Pectin is found near the skin or around the core of fruit, hence either the entire fruit or the parings and cores should be used.

D. Fruits high in jelly-making ingredients, such as tart apples, green grapes, plums, or currants, may be combined with fruits low in jelly-making ingredients, such as strawberries or peaches. If a fruit juice contains sufficient pectin but little acid, a small amount of lemon juice may be added until the juice is approximately as sour as tart apple juice.

3. Preparation of fruit for jelly:

A. Prepare as for fruit juice (Lesson 3), using the method of extraction by heat, which obtains more pectin.

B. If the fruit is rich in pectin, more water may be added to the pulp, the mixture cooked, and the juice extracted a second time. This extraction should be concentrated by boiling before being used. Such juice is low in flavor and may be combined with highly flavored juice for jelly. If not extracted a second time the pulp may be rubbed through a strainer and used in preparation of butters.

4. Proportions of sugar and juice.—The amount of sugar used with a given amount of juice affects the amount of jelly obtained and also the color, flavor, and texture. Too much sugar gives a sirupy jelly which will not hold its shape. Too little sugar gives a tough, opaque jelly. The following general proportions may be used:

A. For juices rich in pectin and acid (apples, green grapes, currants) one cup of sugar to one cup of juice may be used. This gives the maximum amount of jelly, with a good color and texture, but it is sweeter than is necessary or desirable.

B. For average fruit juices, three-fourths cup of sugar to one cup of juice may be used. This gives a good yield, texture, color, and flavor and is the standard amount for general use.

C. For jelly made with the second extraction of juice, which is lower in pectin, one-half cup of sugar may be used to one cup of juice. This gives a smaller amount of jelly with a darker color and a less sweet flavor but with good texture.

5. Other sweeteners in jelly:

A. Any of the other sweeteners, such as sirup or honey, may take the place of part or all the sugar in jelly making. Corn sirup and glucose are most desirable in delicately flavored jellies, while the more highly flavored sirups may be used in tart or highly flavored jellies.

B. For best results not more than 50 per cent substitution (by weight) of sirup for sugar is recommended in jelly. This proportion gives a firm, tender jelly with good flavor. On the basis of three-fourths cup of sugar to one cup of juice, this substitution will require:

For 1 cup of juice (first extraction), $\frac{1}{2}$ cup of sirup and $\frac{3}{4}$ cup of sugar.

For 1 quart of juice, 1 cup of sirup and $1\frac{1}{4}$ cups of sugar.

For a 75 per cent substitution on the basis of $\frac{3}{4}$ cup sugar to 1 cup juice—
For 1 quart of juice, $1\frac{1}{2}$ cups of sirup and $\frac{3}{4}$ cup of sugar.

6. Time for adding sugar or sirup to juices:

A. Sugar or sirup should be added when the jelly is half done. When added earlier the cooking temperature is increased for a longer period of time and a darker jelly with less delicate flavor results.

B. When sugar and sirup are used together, mix and heat until the sugar is dissolved before adding to the jelly.

C. To prevent waste of sugar, jelly should be carefully skimmed before the sugar is added.

7. Tests for jelly:

A. Jelly is done when it "sheets" from the spoon or when two drops form side by side on the edge of the spoon.

B. By the thermometer, jelly is done when cooked to 102° to 103° C. (215° to 217° F.). This test should be used in combination with the test given above. A higher temperature is required by some of the southern fruits. Cooking to too high a temperature gives a candy rather than a jelly.

8. Storing.—Pour into hot sterilized glasses, cover with melted paraffin, and keep in a cool, dry place to avoid mold.

METHOD OF DEVELOPING LABORATORY WORK.

For this lesson the fruit juice extracted in Lesson 3 may be used. Have on display (or make in class) jelly using (1) one-fourth cup sugar, (2) one-half cup sugar, (3) three-fourths cup sugar, (4) one cup sugar to one cup juice, showing the increase in the amount of jelly and the changes in texture. Demonstrate or have students make jelly using (1) 50 per cent sirup to 50 per cent sugar, (2) 100 per cent sirup. Compare for flavor, amount of jelly, and texture. Calculate the cost of the jelly made and reserve the data for comparison purposes in the next lessons. Have the women discuss their difficulties in jelly making and suggest ways to overcome these. The usual mistakes are:

- (a) Too much sugar to juice (sirupy jelly).
- (b) Too little sugar to juice (tough jelly).
- (c) Too short cooking (watery jelly).
- (d) Too long cooking (strong, dark, candied jelly).
- (e) Use of fruit containing too little pectin or acid.

For supplementary home work, the student may be required to make a glass of jelly and bring it to class for comparison, criticism, and discussion of difficulties and ways of meeting them.

LESSON 5. PRESERVES, JAMS, BUTTERS, AND MARMALADES.

AIM.

To give methods of making preserves, jams, butters, and marmalades and to show the proper use of these products in the diet.

POINTS TO BE BROUGHT OUT.

1. Preserves, jams, butters, and marmalades are products which are preserved by a combination of heat and sugar. The general pro-

portions are similar, but they differ somewhat in choice of materials, method of making, and final texture.

2. These products are not economical forms of saving fruit when sugar is scarce because of their high concentration and the large amount of sugar required.

3. They should not be used to replace fresh or canned fruit in the diet because they do not furnish the constituents which make the fresh or canned fruit so valuable. The long period of cooking at a high temperature changes the flavor, the crisp texture, and the bulk.

4. Preserves, jams, butters, and marmalades are chiefly valuable for their desirable flavor and their high fuel value. Since they are concentrated sources generally, they may be used to some extent to save other concentrated fuel foods. With plenty of jam, less butter is eaten. They can not, however, entirely replace butter in the diet on account of its valuable growth-promoting properties.

5. Amount and kind of sweeteners to be used:

A. The maximum amount of sugar, pound for pound, was formerly used in making these products, so that they would keep in open containers. This amount of sweetening is neither necessary nor desirable when the product is to be sealed. The amount of sweetening used may vary from one-fourth to three-fourths by weight. The following proportions may be used for preserves, jams, butters, or marmalades:

(1) For acid fruits, use to every pound of prepared fruit, three-fourths pound of sugar or fifteen-sixteenths cup sirup and three-eighths cup sugar.

(2) For medium sweet fruits, use to every pound of prepared fruit, one-half pound of sugar or two-thirds cup (scant) sirup and one-fourth cup sugar.

(3) For sweet fruits, use to every pound of prepared fruit, one-fourth pound of sugar or one-third cup sirup and one-eighth cup sugar.

More or less sirup may be used, according to the amount of sugar which is available. With the less sweet sirups, at least 25 per cent sugar is desirable for sweetness and flavor. Honey may be used for the entire amount of sweetening. It gives a characteristic flavor which many people like. Sorghum or molasses may be used entirely or in part with spiced butters. The flavor is improved if the sorghum is first boiled with soda, using one teaspoonful to a gallon of sorghum, cooled and skimmed.

6. Methods of making:

A. Preserves.—The aim in making preserves is to obtain a product with a clear, thick sirup, in which are uniform pieces of fruit,

tender yet retaining their shape. Firm fruits are more desirable for preserves. Small fruits may be preserved whole; larger fruits may be divided into pieces.

Since the shape of the fruit is to be preserved, the sweetening is added at the beginning of the cooking process. Weigh the prepared fruit. Weigh the sweetening, using general proportions given in 5. Make a sirup of the sweetening and a small amount of water or fruit juice, add the fruit and cook together until the pieces are tender and transparent and the sirup sufficiently concentrated. Can in sterilized jars or process 20 minutes by the can-cooked method. Very hard fruits, such as pears or quinces, may be partially cooked for tenderness before being added to the sirup. In such a case the water in which the fruit is cooked should be used in making the sirup.

B. Jams.—Jams are made from whole fruits, crushed to a homogenous mass and concentrated to a desired thickness. Small fruits, such as berries, are used and the seeds and skins retained. Cook the fruit with a small amount of water until soft and crush to a smooth mass. Very soft fruits may be crushed without the cooking. Weigh, add sweetening, using proportions given in 5, and cook to the desired thickness. Can in sterilized jars or process 20 minutes by the can-cooked method.

C. Butters.—Butters are similar to jams except that they are made of the fleshy part of larger fruits, cooked to a thick, smooth mass. Spices are usually added. Cook the fruit with a small amount of water until reduced to a pulp. Strain through a colander to remove lumps. Weigh, add a sweetening and spices and concentrate to desired thickness. Can in sterilized jars or process as directed for jams.

D. Marmalades contain both fleshy part and the skin or rind of the fruits, only the seeds being removed. They are usually made of fruits containing a large amount of pectin, either used alone or combined with other fruits. Oranges, lemons and grapefruit are frequently combined with other fruits. Vegetable marmalades may be made by using rhubarb or carrot in combination with fruit. Divide the fruit into small pieces of uniform size. Weigh. Make a sirup of the sweetener and a small amount of water, add the fruit and cook until the fruit is clear and the sirup is of a jellylike consistency. Can in sterilized jars, or process as directed for jam, or pour into sterilized glasses and cover with melted paraffin.

E. Fruit leathers may be made from butter or marmalade; spread in a thin layer on an oiled platter and dried in the sun or by artificial heat. Cut into squares or roll and slice and use as a confection.

METHOD OF DEVELOPING LABORATORY WORK.

Demonstrate or have made in class preserves, spiced butter sweetened with sorghum or molasses, vegetable marmalade and fruit leather, made from seasonable fruits. Call attention to the effect on the shape and texture of the fruit when the sweetening is added in the beginning, as in preserves and marmalade, or after the fruit is cooked tender, as in jam or butter. Have the student calculate the cost of the product made and compare with the cost of jelly and of canned fruit, so that they may see the economical way to use a given amount of fruit.

Suggest that where jelly is made the pulp may be used for spiced butter or fruit leather. If it is low in flavor, after the removal of the fruit juice, it may be combined with other fruit with a good flavor.

An assignment of home work may be made as in Lessons 1 and 2.

SPICED APPLE BUTTER.

Sweet apple cider, 4 gallons.

Apple sauce (made from peeled and sliced apples, cooked and run through a colander), 4 gallons.

Boil the cider until it is reduced to one-half the amount. Add the apple sauce and cook slowly until thick (4 to 6 hours), stirring constantly to avoid scorching. When nearly done, add 1 pound sugar, $\frac{1}{2}$ teaspoonful ground cloves, $\frac{1}{2}$ teaspoonful allspice, and 1 teaspoonful ground cinnamon for each gallon of apple butter. Seal in sterilized jars or sterilize by the can-cooked method.

If cider is not available it may be omitted, and the apple sauce may be concentrated, sweetened, and spiced. A grape flavor may be added by using 1 pint grape juice to each gallon of cooked apples.

PLUM BUTTER.

Cook plums in little water until tender; run through a colander to remove stones and skins. Sweeten in the proportions given in 5, add spices if desired, and cook until thick. If the tart flavor is objectionable, an equal quantity of cooked apple sauce may be used with the plum pulp.

MOCK ORANGE MARMALADE.

Ground carrot, 2 cups.
2 lemons (juice only).

1 orange (juice and grated rind).
Sugar, 1 cup.

Cook without stirring until thick. Place in jars and sterilize by the can-cooked method.

CARROT, PINEAPPLE, AND RHUBARB MARMALADE.

Ground carrot, $\frac{3}{4}$ cup.
Shredded pineapple, cooked until tender, $\frac{3}{4}$ cup.

Unpeeled rhubarb, cut into small pieces, $1\frac{1}{2}$ cups.
Sugar, $1\frac{1}{4}$ cups.
1 lemon, quartered and sliced.

Cook without stirring until thick. Season with a little gingerroot if desired.

ORANGE MARMALADE.

Oranges, 1 pound.

Sugar, $\frac{3}{4}$ pound.

Select smooth, sour oranges. Remove the peel in quarters and cook in boiling water until soft. Drain, scrape out white part, and cut the thin rind into strips with the scissors. Divide oranges into sections; remove seed and skin. Put into kettle and heat to boiling point, add the sugar gradually, and cook one hour. Add the rind and cook until it gives the jelly test. Turn into glasses.

ORANGE AND GRAPEFRUIT MARMALADE.

Use equal numbers of oranges, grapefruit, and lemons. (One of each is the usual number.) Prepare the fruit as for orange marmalade, omitting the rind. To the pulp add three times its bulk of water, boil 15 minutes, and let stand overnight. The next morning, boil for 10 minutes. Let stand until cold, then add an equal amount of sugar, and cook rapidly until the mixture gives the jelly test. Allow it to cool a little, then pour into glasses.

LESSON 6. PICKLES.

AIM.

To show the methods of combining fruit or vegetables with sweetened or unsweetened or spiced vinegar to make pickles, and to show the place of pickles in the diet.

POINTS TO BE BROUGHT OUT.

1. Pickles have little food value aside from the amount of sweetening they contain. When used in moderation, they serve as a relish and offer a means of adding flavor to a meal. They should not be given to children.

2. The desirable qualities in pickle are freshness, crispness, good flavor, uniformity in size of the pieces, and good proportion of liquid to solid.

3. The preservative used is the vinegar. Sweetening and spices are added for flavor rather than any preservative qualities, except in the case of sweet pickles, where the amount of sugar used is sufficient to help in the preservation. The amount and kind of spices are varied according to taste. The vinegar should be of a good grade to insure good pickles. Older vinegar is the most desirable for pickle making. Agate or porcelain-lined kettles should be used to avoid the action of the vinegar on metals.

4. Crisp vegetables, such as cabbage, cauliflower, onions, green beans, green tomatoes, and peppers, either singly or in any desired proportion, may be used for pickles. Firm fruits, such as apples, peaches, pears, and melon rind, are suitable for pickling. Relishes are made of various highly seasoned combinations of green or ripe

fruits or vegetables, sometimes left in pieces and in some cases cooked to a pulp and strained.

5. Steps in pickling:

A. Removal of excess water.—Vegetables used for pickle making are more than four-fifths water. Unless some of this is removed before the vinegar is added, it will weaken the vinegar so the pickles will not keep. The water may be removed by:

- (1) Salt brining.—Vegetables may be soaked overnight or longer in a strong brine (1 pint salt to 1 gallon water.)
- (2) Dry salting.—Sliced vegetables may be placed in layers, salt sprinkled between the layers, and left to drain.
- (3) Mechanical pressure.—Finely chopped vegetables may be pressed in a bag or a press to remove excess water.
- (4) Combination of dry salting and mechanical pressure.—Vegetables may be dry salted, as in 2, and then pressed in a bag or press to remove the water.
- (5) In the case of some fruit pickles, where the use of salt to extract the water would add an undesirable flavor, the water is removed by evaporation during the process of cooking.
- (6) Unless the vegetable is to be left for some time in brine as a preservative, or unless the salt is used to control fermentation, avoid using so much salt that it is necessary to soak the vegetables in water before the vinegar is added. When this is done, some of the water content is replaced in the vegetables. Where it is necessary to remove excess salt, as in the case of vegetables which have been long in brine, the vegetables may be soaked in vinegar so that it enters the cells in place of the water which has been removed.

6. Methods of adding vinegar and flavoring material.—In order that the vinegar and the flavoring material may thoroughly penetrate the cells the pickle must either be finely chopped, so that the cells are broken, or heated sufficiently to allow the pickling fluid to pass through the cell walls. Long cooking is not desirable. If cooked too long, or at too high a temperature, pickles lose the fresh, crisp taste, which is one of their desirable attributes. The seasoned vinegar may be added by one of the following methods:

A. Heat the material just to the boiling point in the seasoned vinegar. This method should be used when the material is in large pieces.

B. Heat the seasoned vinegar and pour over the material. Drain off and reheat if necessary.

C. Finely chopped materials may be covered with cold, seasoned vinegar. No heating is necessary if the excess water has been sufficiently removed.

D. Fruits may be treated as in (A) or (B). If much water is present, some cooking may be necessary for evaporation.

7. Method of storing pickles.—Sealing is a convenient way of storing pickles, but it is not necessary. They will keep in crocks, stone jars, or similar containers if the liquid comes well above the surface of the pickles. Weight, if necessary. Keep the container well covered. If mold appears, it should be carefully skimmed off, and the vinegar drained off, reheated, and poured back, or fresh vinegar used.

METHOD OF DEVELOPING LABORATORY WORK.

Discuss good combinations of vegetables or suitable fruits for pickle making. Emphasize the fact that pickle making should not in any sense take the place of canning or drying, which preserves more of the food value, but that it offers a way of conserving vegetables in the late fall which will not mature before frost, and of supplying a variation in texture and flavor to the diet.

Any of the recipes given below may be used for demonstration or class practice. Where it is desirable to save sugar, molasses or sorghum may be substituted for brown sugar in spiced pickles, using three-fourths cup of sorghum in place of one cup brown sugar.

SWEET SPICED VINEGAR.

Vinegar, 1 pint.	Mixed spices, 1 ounce.
Sugar, 2 pounds.	

SOUR SPICED VINEGAR.

Vinegar, 1 quart.	Allspice, $\frac{1}{2}$ tablespoon.
1 red pepper.	Cloves, $\frac{1}{2}$ tablespoon.
$\frac{1}{2}$ stick cinnamon.	

CLOWCHOW.

Ripe tomatoes, 1 peck.	Cinnamon, 5 teaspoons.
Green tomatoes, $1\frac{1}{2}$ pecks.	4 hot peppers.
Sweet peppers, $1\frac{1}{2}$ dozen.	Sugar, 6 cups.
White mustard seed, 3 tablespoons.	Vinegar, 1 gallon.
Onions, 1 dozen.	Grated horseradish, $1\frac{1}{2}$ cups.
Celery seed, 5 teaspoons.	

Chop the vegetables. Sprinkle with a cup of salt and drain overnight. Heat the seasoned vinegar to the boiling point and pour over the vegetables. Add horseradish last.

CHILI SAUCE.

Ripe tomatoes, 2 quarts.	Ginger, 1 tablespoon.
4 green sweet peppers.	Salt, 2 tablespoons.
Brown sugar, 4 tablespoons.	Cinnamon, 1 teaspoon.
1 hot pepper.	Nutmeg, $\frac{1}{2}$ teaspoon.
4 onions.	

Chop the vegetables, add other ingredients, and cook until tender. Add 3 cups vinegar, boil five minutes and seal.

WATERMELON RIND SWEET PICKLE.

Trim off the green and red parts, cut the rind into suitable pieces, and cook until tender in salt water (1 teaspoon salt to 1 quart water). Drain and cook until clear in the following sirup:

Sugar, 3 cups.	Cloves, 1 teaspoon.
Vinegar, 3 cups.	Cinnamon, 2 teaspoons.

DIXIE RELISH.

Cabbage, chopped, 1 quart.	Mustard seed, 4 tablespoons.
White onion, chopped, 1 pint.	Celery seed, 2 tablespoons.
Sweet red pepper, chopped, 1 pint.	Sugar, $\frac{3}{4}$ cup.
Sweet green pepper, chopped, 1 pint.	Cider vinegar, 1 quart.
Salt, 5 tablespoons.	

Soak the peppers in brine (water, 1 gallon; salt, 1 cup) for 24 hours. Freshen for two hours in cold water. Drain, remove white sections and seeds. Chop all vegetables separately, measure, mix, and add vinegar, sugar, and spices. Let stand overnight in a crock or enameled dish. Just before packing, drain off the vinegar to facilitate packing. Pack the relish in jars, pressing it down thoroughly; add the drained-off vinegar, being sure that all the air is forced out of the jar and replaced by vinegar. Process for 15 minutes at 82° C. (180° F.).

CHERRY PICKLES.

Seed the cherries. Let stand overnight with cup of sugar to each quart of cherries. Drain off juice and bottle. Pour over the cherries a hot, sweet, spiced vinegar (see proportions above), using the cherry juice which drains from the fruit to take the place of a part of the vinegar. Seal.

LESSON 7. SALTING AND FERMENTATION.

AIM.

To show how vegetables may be preserved by salting or by fermentation and to give methods of preparing such vegetables for the table.

POINTS TO BE BROUGHT OUT.

1. Salting and fermentation are two simple methods of controlling food spoilage. In the process of salting sufficient salt is added to the food to prevent all growth of organisms. In the process of fermentation, a small amount of salt is added and fermentation allowed to take place. When sufficient lactic acid has been formed in the food, it checks fermentation and prevents further change in the material.

A. Advantages:

- (1) They are easy methods by which a large quantity of food can be kept with a small amount of labor and expense.
- (2) They give wholesome products with distinctive flavors.

(3) Food so preserved is easily stored. It does not need to be sealed but may be kept in barrels, crocks, stone jars, etc.

(4) No additional equipment is required beyond that usually found in any kitchen.

B. Disadvantages:

(1) These methods of preservation are not suited to all products.

(2) There is a decided change of flavor in the material which some people do not like.

(3) There is some loss of food value, especially if the material is soaked in preparation for the table to remove any excess salt or acid.

(4) A cool place is required for storage.

(5) Some attention is necessary to prevent the growth of mold on the surface and the consequent spoiling of the top layer of food.

2. Directions for preserving vegetables by salting:

A. Vegetables are washed, drained, and weighed. Use one-fourth as much salt, by weight, and pack in alternate layers with a layer of salt on top. Cover with a plate or a wooden cover slightly smaller than the container, and weight. The salt and juices of the vegetables will form a brine strong enough to prevent fermentation or spoilage. If sufficient brine to cover is not formed, strong brine should be added, made in the proportion of 1 pound of salt to 2 quarts of water.

B. Treatment of the surface to prevent growth of mold.—If mold is allowed to grow on the surface it will weaken the brine so that material will not keep. This may be prevented by one of the following methods:

(1) Watch the brine and skim off any film or mold as it appears. The cover should also be scalded.

(2) A layer of melted paraffin may be poured over the surface to exclude the air. This will prevent formation of mold. Care must be taken not to break the paraffin in moving the container, else it must be removed, reheated, and poured back to form an airtight seal.

(3) The brined vegetable may be packed in a tight keg or barrel, the head put into place, and brine added until no air space remains. If the container is water-tight the vegetable will keep indefinitely with no further attention.

C. Vegetables which may be kept by salting.—Greens, beet tops, turnip tops, spinach, chard, kale, cabbage, string beans, peas, and

corn. Peas should be shelled before being salted. Beans should be strung and cut into pieces. Corn should be cooked until the milk is set, then cut from the cob and packed.

3. Directions for preserving vegetables by fermentation with dry salting:

A. Vegetables containing a large proportion of water may be treated as in dry salting, using 3 pounds of salt to 100 pounds of vegetable. Cover, weight and set aside to ferment. The time required for fermentation depends principally upon the temperature. In warm weather it will require eight to ten days. In cool weather it will require two to four weeks. Fermentation is complete when bubbles no longer rise to the surface. The surface should then be treated as directed in 2B to prevent growth of mold. This process is suited to such vegetables as string beans, beet tops, turnip tops, and cabbage, and is the method used in making sauer kraut.

B. Fermentation in brine.—Vegetables containing a smaller amount of water may be fermented by covering with a weak brine made in the proportion of 1 gallon of water, $1\frac{1}{2}$ pints of vinegar, and three-fourths cup salt. Weight, allow to ferment as in A, and treat to prevent mold. This method is used for such vegetables as cucumbers, green beans, or peas.

4. Methods of preparing salted or fermented vegetables for the table:

A. Salted vegetables should be soaked in several changes of water to remove the excess salt, then prepared as for fresh vegetables. There is necessarily some loss of food value and original flavor.

B. Fermented vegetables should be cooked without soaking, if an acid flavor is desired. If preferred, this acid flavor may be partially removed by soaking before cooking as for salted vegetables.

METHOD OF DEVELOPING LABORATORY WORK.

This lesson may be used as a demonstration or as a class practice. One salted vegetable, such as greens or beans, and one fermented vegetable, such as sauer kraut, may be prepared. Since the process of fermentation requires some days the students should be required from time to time to note the progress of the process and see that the growth of mold is properly controlled.

If preferred, the students may be required to preserve vegetables at home by salting and by fermentation, and to report the results to the class.

The remainder of the laboratory period should be used finishing the pickles started during the previous lesson.

LESSON 8. DRYING FRUITS AND VEGETABLES.

AIM.

To show an easy, economical, and satisfactory method of preserving fruits and vegetables by sun drying or drying by artificial heat.

POINTS TO BE BROUGHT OUT.

1. Drying consists of removing sufficient moisture from the product so that the organisms can not grow and multiply in it. Sufficient heat is necessary to evaporate the moisture and a current of air to remove it from the surface. In home drying this may be done by (1) sun heat, (2) artificial heat, or by (3) air heat, or by a combination of these. Some authorities recommend blanching of all products before drying. Where this is done it should be for short time to prevent loss of soluble constituents. Blanching lessens the possibility of enzymatic changes and so improves the appearance and the keeping quality.

2. Advantages of drying:

A. In the process of drying, only the water is removed; therefore the food value of the product is preserved.

B. Any quantity, large or small, or a variety of products may be handled at one time.

C. The process requires little equipment, which may easily be made at home.

D. It requires little time and attention.

E. Dried products require no special type of container, but may be stored in containers which can be found in any home.

F. Drying reduces the bulk and weight of the product, enabling it to be easily handled or shipped or stored in a small space.

Table showing reduction in weight by drying.

[Adapted from Farmers' Bulletin 984.]

Apples, 100 pounds; reduce to 10 to 15 pounds.
 Beans, 100 pounds; reduce to 11 to 13 pounds.
 Corn, 100 pounds; reduce to 22 to 33 pounds.
 Okra, 100 pounds; reduce to 10 to 11 pounds.
 Peaches, 100 pounds; reduce to 13 to 16 pounds.
 Peas, 100 pounds; reduce to 22 to 26 pounds.
 Pumpkins, 100 pounds; reduce to 6 to 8 pounds.
 Berries, 100 pounds; reduce to 16 to 23 pounds.
 Spinach, 100 pounds; reduce to 8 to 10 pounds.
 Tomatoes, 100 pounds; reduce to 6½ to 9 pounds.

NOTE.—The variations depend upon the age and moisture content of the product as well as the method of preparation, paring, etc.

3. Methods of drying:

A. Sun drying—

(1) This is a simple and economical method because it requires little equipment and there is no expense for fuel, but it is slow because the heat is not sufficient for rapid evaporation.

(2) It requires considerable handling of the product since it must be protected from dew or rain.

(3) It is an uncertain method, because a cloudy or rainy day early in the process of drying may cause spoilage.

(4) The product has a good flavor, but is dark in color and is frequently exposed to dust and insects.

B. Drying by artificial heat—

(1) A more rapid method than sun drying but more expensive, since fuel is necessary.

(2) Requires attention to keep the product from overheating.

(3) May be done independently of weather conditions.

(4) The product retains its natural color better than when sun dried, and may easily be protected from dust and insects.

C. Drying by an air blast—

(1) Not so rapid a method as drying by artificial heat, but somewhat more rapid than sun drying.

(2) Requires some special equipment which may already be found in the home. An electric fan may be used to furnish the air current.

(3) The rapid circulation of air keeps the product cool and this aids in retaining color and avoiding spoilage.

4. Types of driers:

A. For sun drying—

(1) Clean boards, trays, cloth, and paper may be used on which to spread the material.

(2) Shallow trays may be used, or specially constructed frames covered with glass to protect from dust and insects. Small screened openings in the side provide for a circulation of air to remove the moisture.

B. For drying by artificial heat—

(1) The oven of an ordinary stove may be used, the materials being placed in shallow pans or trays. The door should be left partly open. It is difficult to gauge the heat by this method, and there is little circulation of air.

(2) Specially constructed driers of various types may be made of shallow trays placed one above the other and designed to be stood upon the top of a stove or other heating arrangement or be hung above it. The bottom of the trays are of small meshed wire, so that the current of warm air may pass up through the material and out at the top of the drier.

(3) A variation of the above type has a tray which is heated by a pan of warm water, thus maintaining an even temperature with no danger of overheating.

C. For drying with an air blast.—Open trays may be used or trays placed in tiers, leaving a small space between so that the blast of air may readily reach the material.

5. Steps in drying:

A. Preparation of material—

(1) Fruits or vegetables should be cleaned and prepared as for cooking. Root vegetables should be pared. Peas should be hulled and beans strung. Fruit may or may not have the skins removed.

(2) Small fruits or vegetables may be dried whole. Large fruits and vegetables should be divided into pieces of uniform size and shape, both for greater rapidity in drying and for convenience in preparation for the table. When large quantities are being handled, some type of vegetable slicer will save time.

(3) Vegetables are sometimes blanched (Lesson 2) to soften the fiber and shorten the time of drying and set the color, but this process is not essential to successful drying. In the case of corn, it is better to blanch or precook until the milk is set before cutting from the cob in order to avoid waste.

B. Drying—

(1) In sun drying the material should be spread in thin layers in the direct sunshine, and stirred occasionally until sufficiently dry.

(2) In drying by artificial heat the material should be placed in thin layers in the drier and drying begun at a temperature of 43° C. (110° F.). This temperature is gradually raised to 63° C. (145° F.). (See Farmers' Bulletin 841 for variations in temperature for different products.) The time required for drying by this method will vary from two to four hours, depending upon the kind of product, size, and shape of the pieces, and the temperature maintained. The material should be stirred occasionally and the trays changed so that they are heated alike.

(3) Drying by air blast.—The material is placed where the direct current of air will reach every piece and is left until sufficiently dry, being stirred occasionally.

C. Tests for dryness.—Fruits and vegetables should be dried uniformly throughout, but need not be so dry that they snap or crackle. They are sufficiently dry when broken edges show no moisture or when the pieces readily fall apart when several are compressed in the hand.

6. Storing dried products:

A. Dried products should be allowed to dry uniformly before being packed. Stir occasionally. The length of time will depend upon climate and altitude.

B. Sun-dried products which have been exposed to insects should be heated to 82° C. (180° F.) before being packed. This will destroy any eggs of insects which would otherwise develop in the dried product and spoil it.

C. Any type of light and insect proof containers may be used for storage, such as tin cans, paper bags, pastboard boxes, or paraffin paper cartons. They should be kept in a cool, well-ventilated place.

7. Method of cooking dried products. (See Unit II, Lesson 2.)

METHOD OF DEVELOPING LABORATORY WORK.

If a homemade or commercial drier can be obtained, the students should dry a vegetable and a fruit, using the directions in Farmers' Bulletin 841. Choose for this work a fruit and a vegetable not commonly dried in the community. Ask the students to list the products which are dried in their homes and to make a second list of products which might be dried advantageously.

Discuss with them the comparative advantages of canning and drying and the products which are especially suited to each method. If time is available, a dried fruit and a dried vegetable should be cooked and compared with the canned product as to (1) cost, (2) ease of preparation, (3) flavor, and (4) food value.



LESSON 9. HOME STORAGE OF FRUITS AND VEGETABLES; PRESERVATION OF EGGS.

AIMS.

(a) To give directions for the successful home storing of fruits and vegetables.

(b) To show the methods of preserving eggs in waterglass.

POINTS TO BE BROUGHT OUT.

1. Storage of fruits and vegetables:

A. Fruits and some vegetables, if properly stored, may be kept for weeks or months, and may be used in the fresh state as an economical and healthful source of food.

B. The main requisites for proper storage are:

(1) A suitable temperature.—This varies with the type of fruit or vegetables, some requiring considerable warmth, others keeping best at a temperature just above freezing.

(2) Circulation of air.

(3) Control of moisture conditions.—Sufficient moisture should be present to prevent shrinkage, but not enough to cause

mold. A few types of fruit and vegetables require dry atmosphere.

C. Types of storage:

(1) Basement cellars.—Suitable if cool and well ventilated. A furnace in the room will make the air too warm and dry unless a partition is put in. Windows or a ventilator will provide circulation of air. Barrels, crates, boxes, or bins may be used for containers.

(2) Outdoor cellars or caves.—Inexpensive, but very satisfactory. May be built entirely or partially below the ground or above the ground, according to the severity of the climate. May be kept at a uniform temperature for a long period. The door and a ventilator will provide for circulation of air. If floor is of earth, sufficient moisture will be present to prevent shrinkage of vegetables.

(3) Outdoor pits.—May be made by choosing a well-drained location, digging a shallow pit 6 to 8 inches deep, and lining it with straw or leaves. The vegetables are placed on the litter in a cone-shaped or long A-shaped pile, covered with straw and then with a few inches of dirt, the depth varying with the severity of the climate. In a small pit the straw should extend through the dirt at the top, thus furnishing a space for ventilation. In a large pit a small board flue should be placed in the center for this purpose. If several kinds of vegetables are to be stored at the same time they may be stored in layers, so that when the side of the pit is opened any vegetable may be reached with no difficulty.

(4) Attic or other dry, warm room.—This is satisfactory for a few types of vegetables which are very susceptible to cold or moisture.

D. Method of storage used for different types of fruit and vegetables:

(1) Apples, beets, carrots, potatoes, parsnips, salsify, or similar root crops may be stored in an indoor or outdoor cellar or in pits. They will keep with little difficulty.

(2) Cabbage or turnips should be stored in an outdoor cellar or pit, as the odor is disagreeable if stored in a cellar beneath the house. Slight freezing will not injure them.

(3) Sweet potatoes should be kept dry and not allowed to chill. Dig on a dry, warm day, dry out thoroughly for a week or 10 days, and store in a warm, dry room, such as an attic, near the chimney, or in the basement near the furnace. They are sometimes buried in sawdust, oats, or shavings, or wrapped in paper to avoid any moisture.

(4) Onions should be thoroughly dried out and stored in a dry, well-ventilated room; a slight freezing will not injure them.

(5) Pumpkins and squashes require a dry, well-ventilated room, with a moderately cool temperature. Do not let them touch each other as moisture will form at the point of contact and cause decay.

(6) Pears may be gathered when mature but still hard, wrapped in paper, and kept in a cool, dry place to ripen.

(7) Tomatoes may be kept for weeks if the mature green tomatoes are carefully picked just before frost and laid to ripen on straw or similar material where they will not freeze. A similar method is to pull up the vines and hang them, top downward, in a cellar where they will not freeze. The tomatoes will ripen gradually as the vines dry.

(8) Dried peas and beans may be stored in bags in a dry, well-ventilated place. If thoroughly heated to 63° C. (145° F.) before storing all eggs of insects will be destroyed.

E. General suggestions for storing:

(1) Vegetables or fruits chosen for storage should be sound, mature, but not overripe.

(2) Several small containers are better than one large one, since the weight of the upper layers tends to bruise the lower layers.

(3) Stored fruit or vegetables should be picked over occasionally and any showing signs of spoilage removed.

2. Preservation of eggs:

A. Methods of preserving eggs.—Eggs may be satisfactorily preserved so that they may be had in greater abundance during a time of scarcity or when price prevents their frequent use. There are many ways of home preservation, such as packing in grain or sawdust or preserving in water glass, the length of time before spoilage occurs depending upon the method used. The latter method is most successful, and eggs so preserved may be kept for as long a time as a year. They are practically as good as fresh eggs for all cooking purposes. The whites beat up. Commercial eggs are preserved by keeping in cold storage, freezing, canning, or by reducing to powdered form.

B. Choice of eggs for preservation:

(1) Eggs should be preserved during March, April, May, and June, when the production is greatest and the quality best.

(2) Only absolutely fresh eggs should be preserved. If there is any doubt as to the freshness of eggs, candle them or see whether they sink when placed in a dish of fresh water. If an egg floats or tends to float, it is not fresh.

(3) Eggs which are dirty or have been washed should not be used. Washing removes the protective gelatinous coating. Dirty eggs will have a tainted flavor.

(4) Spring eggs keep better than summer or fall eggs. Infertile eggs are better than fertile eggs for preserving.

C. Preservation of eggs in water glass.—Water glass may be obtained in the form of a powder. It should be dissolved in an amount of water as stated in directions on the package. Commercial water-glass solution may be obtained from any drug store but is less reliable since it varies in concentration more than the other form. If the commercial water-glass solution is to be used, mix $1\frac{1}{2}$ quarts with 18 quarts of pure water; water that has been boiled is preferable. Stir the mixture until the ingredients are thoroughly mixed. A stone jar is the most suitable vessel for the mixture. Two 8-gallon jars are sufficient for 30 dozen eggs, using amount of solution just prescribed. After the water glass is thoroughly mixed pour it into the vessels to be used, being sure that the vessels are absolutely clean. Place the eggs in the water glass, see that those at the top are submerged under at least 2 inches of the liquid, and cover the jars in order to prevent evaporation. Put the jars in a cool place where they will be undisturbed during the year. Do not use the same liquid preservative more than one year.

D. Use of eggs preserved in water glass:

(1) Eggs should not be left in the preservative more than one year.

(2) Rinse the eggs with water after removing from the preservative.

(3) Eggs that are in good condition when removed from water-glass solution will remain good for at least two weeks.

(4) If eggs are to be boiled prick a small hole through the large end of the shell before placing them in the water. The pores of the shell have been sealed by the water-glass solution, and without the pinhole the expanding air within the shell would burst it.

METHOD OF DEVELOPING LABORATORY WORK.

This lesson may be used as a lecture and class discussion, with a demonstration by the teacher on the preservation of eggs in water glass. If it is possible to obtain eggs that have been preserved by this method for some months one should be broken and compared with a fresh egg, then cooked and compared with the cooked fresh egg. The class may be asked to calculate the cost per dozen of eggs stored by this method as compared to the cost of fresh eggs during December and January.

LESSON 10. PRESERVATION OF MEAT.

AIM.

To give methods suitable for use in the home preservation of meat.

POINTS TO BE BROUGHT OUT.

1. Reasons for home preservation of meat:

A. Takes care of a surplus and avoids waste.

B. The home-preserved product, if carefully handled, has a superior flavor.

C. Saves transportation. Families selling fresh meat and then buying cured meat for home use are putting a double burden on transportation.

2. Methods of preservation:

A. Canning—

(1) Method.—Meat may be canned by the same process that is used for vegetables. (Lesson 2.) Either of the following methods may be used:

(a) Cut into convenient pieces and pack raw into the jar. Add one teaspoon salt to each quart, and fill jar with boiling water. Sterilize four hours in water-bath canner or one hour under 10 pounds pressure.

(2) Adapted to any fresh meat, poultry, fish, or game. May be used also for left-over meats or meat soups.

(b) Cook as usual until three-fourths done. (Bake, boil, fry, etc.) Pack into jars, add salt and the liquid from the cooked meat (or hot water). Sterilize three and one-half hours in water-bath canner or one hour under 10 pounds' pressure.

B. Partial cooking and packing in hot fat may be used for preserving cooked meats during the cold winter months.

(1) Method.—Meat is cut into pieces of suitable size, cooked by dry heat (fried or baked) until nearly done, then packed in a jar and covered with hot lard. Should be well covered and kept in a cool, dark place.

(2) Suitable for pork sausage, spare ribs, or loin.

C. Curing—

(1) Ingredients used in curing meat:

(a) Salt.—A good preservative when used liberally, but tends to dry out and harden the tissues.

(b) Sugar.—A preservative when used in large quantities; usually added for the flavor. Molasses or brown sugar are frequently used.

(c) Pepper.—Used chiefly for flavor, since the small quantity used is not sufficient for preservation. Not soluble, hence is used only in dry cures.

(d) Saltpeter.—Sometimes used to preserve the red color of meat, but neither necessary nor desirable.

(e) Borax.—Undesirable and unnecessary. When used, it hardens the tissues and causes waste of much of the outside of the meat. It is used to prevent infection of the meat by insects.

(2) Dry curing—

(a) Method.—A mixture of salt, sugar, and pepper in the proportions of 40 pounds salt, 10 pounds sugar, 4 pounds white or black pepper, and one-half pound red pepper are used to 1,000 pounds fresh meat. A larger proportion of the mixture is used to the same amount of meat in the southern States. The cure should be rubbed thoroughly over the meat and left until meat is thoroughly preserved (from one and one-half to two days for each pound of meat).

(b) Suitable for pork, especially hams, shoulders, bacon, and Dixie squares.¹

(3) Brine curing—

(a) Method.—A brine made in the proportion of 8 pounds of salt to 2 gallons of water (or 7 pounds salt and 2 pounds sugar to 2 gallons of water if a sweet cure is desired) may be used to cover meat which has been rubbed well with salt and packed in a barrel. Meat should be repacked and covered with the same brine after several days, so that all parts of the meat may be reached by the brine. Time required is same as for dry cure.

(b) Suitable for pork, such as bacon, hams, shoulders, and Dixie squares,¹ or for "corned" beef (plate, rump, cross ribs, or brisket).

(4) Smoking.—Dry or brine cured meats are often smoked to aid in their preservation (by means of the creosote from the smoke) and to add flavor. The pieces are washed to remove the outside salt, dried, and hung in the smoke from a small fire until sufficiently colored. The time varies from a few days to two weeks, depending upon the degree of flavor desired and whether a continuous or intermittent fire is kept. Hickory is considered the most desirable, but any wood may be used for the fire except pine, which deposits a black soot on the meat.

¹ Dixie squares are square pieces of the jowl of the pig.

(5) Storing cured meat.—Cured or smoked meat should first be wrapped in cloth, which will protect the meat from injury by mold; then inclosed in a paper sack to protect it from insects. It should then be hung out of reach of mice or rats, in a place with a good circulation of air. A damp room, such as a cellar, is not satisfactory for storing meat.

D. Drying—

(1) In an arid climate, meat such as beef or venison may be dried by exposing it fresh to the air, taking care to protect it from insects.

(2) In less dry climates the meat may be rubbed with a dry cure, packed into jars and allowed to stand in the liquid formed for nine days, repacking and rubbing with the cure every three days. Remove from the cure, smoke, and hang in a dry room or near a fire.

E. Utilization of by-products.—By-products, such as trimmings of beef or pork heads, feet, tails, hearts, liver, and similar parts, may be preserved for later use by being made into various types of sausage, headcheese, or scrapple. The headcheese or scrapple can be kept only a short while; the sausage may be kept for several months by being stuffed into casings and smoked, or into cloth bags, the outside of the bag being rubbed with melted lard or paraffin.

METHOD OF DEVELOPING LABORATORY WORK.

Unless this lesson can be given at a time when an actual demonstration on curing meat may be attended in some home, the lesson may be given as a lecture by the teacher. For laboratory work, poultry or fish may be canned according to the directions given, or any of the recipes below may be tried in class or used at home and reported in class.

SAUSAGE.

Use choice trimmings, about one-fourth to one-third fat. Pork and beef or pork and rabbit may be combined. To 100 pounds of meat add 2 pounds of salt, 3 ounces white pepper, 3 ounces ground sage and $\frac{1}{2}$ ounce red pepper. Mix well with the meat before grinding. Stuff in casing or cloth bags, or fry down and cover with hot fat or can by any suitable method.

LIVER SAUSAGE.

Use meat and skin from heads, feet, and tails about equal in weight to the amount of livers. Scald the livers 10 to 15 minutes in boiling water; cook the other meats thoroughly. Season well with salt, pepper, and other spices if desired. Add 5 pounds of red dog flour to 100 pounds of the meat; moisten well with the liquor and grind fine. Stuff in casings and cook for half an hour.

HEADCHEESE.

Cook a cleaned hog's head until the meat falls from the bones. Chop the meat, season well, add enough of the liquor to make moist, and spread in a dish or pan to set. If desired, the feet, tails, heart, stomachs, and similar parts may be used with the heads.

SCRAPPLE.

Make as for headcheese, cooking the meat tender, removing from the bone and separating it into small pieces. Add the liquor, return to the stove, and stir in corn meal or a mixture of one-half corn meal, one-fourth wheat middlings, and one-fourth buckwheat flour, until it makes thick mush. Cook slowly for an hour, pour into shallow pans to cool, and mold. It may be sliced thin and fried.

REFERENCES.

United States Department of Agriculture:

Farmers' Bulletin No. 830. Marketing Eggs by Parcel Post.

Farmers' Bulletin No. 839. Home Canning by the One-Period Cold-Pack Method.

Farmers' Bulletin No. 853.—Home Canning of Fruits and Vegetables as Taught to Canning Club Members in Southern States.

Farmers' Bulletin No. 375. The Care of Food in the Home.

United States Department of Agriculture, Office of Extension Work, South, A-89. Jelly and Jelly Making.

Farmers' Bulletin No. 900. Homemade Fruit Butters.

Farmers' Bulletin No. 881. Preservation of Vegetables by Fermentation and Salting.

States Relation Service—Circular A-92. Home Canning of Meats and Sea Foods with the Steam-Pressure Canner.

Farmers' Bulletin No. 879. Home Storage of Vegetables.

Farmers' Bulletin No. 548. Storing and Marketing Sweet Potatoes.

Farmers' Bulletin No. 984. Farm and Home Drying of Fruits and Vegetables.

Farmers' Bulletin No. 841. Drying Fruits and Vegetables in the Home, with Recipes for Cooking.

Bulletin No. 471. Eggs and their Value as Food.

Animal Industry Circular G-25. The Candling and Preservation of Eggs.

Department Bulletin 241. Studies on Fruit Juices.

United States Food Administration Leaflets (see note at end of Lesson 6, Unit II):

Canning Fruit Without Sugar.

Jelly, Fruit Juices, and Leathers.

Preserving Vegetables by Salting, Drying, and Storing.

UNIT X.

Food for the Family.¹

LESSON 1. HOW TO ESTIMATE THE FOOD NEEDS OF THE BODY.

AIM.

To give a practical method by which the housekeeper can estimate the foods needed per person per day.

POINTS TO BE BROUGHT OUT.

1. Function of foods in the body:

A. The body must be supplied with sufficient food of the proper kind.—

(1) To provide all of the substances essential for normal growth and health.

(2) To supply fuel for the day's work and for the maintenance of the body temperature.

(3) To furnish material to build the body and to replace those parts which are constantly wearing out.

(4) To regulate all the processes of the body, and to keep it in good running order.

2. Classification of foods:

A. The five classes of foods which will supply all these needs are usually referred to on the basis of their composition. In planning her daily menu it is simpler for the housekeeper to classify foods as they appear on the market and remember that some foods from each group should be supplied to each person each day.

Group I. Fruits and vegetables (including potatoes).

Group II. Meat, poultry, fish, eggs, cheese, and milk.

Group III. Cereals (including bread and baked goods) and legumes.

Group IV. Sugar and other sweet foods.

Group V. Butter, cream, and other fats.

3. Body requirements estimated in pounds and ounces:

A. The body requirements of food are frequently measured in amount of protein and of calories. This requires some time and calculation. Since foods are usually purchased on the basis of weight

¹ This unit has been prepared from unpublished material by the Home Economics Office, Department of Agriculture.

it is easier for the housekeeper to estimate the food requirement for her family on that basis. The average estimate given below may be used as a guide. It represents the normal diet which does not take into special consideration either cost or conservation of any group of foods. The limits of variation show how many different combinations are possible by increasing the amount of food chosen from some groups and decreasing that from other groups.

Food for one day for a man of average size doing moderately active work (Hunt).

Food.	Daily allowance.	Safe limits of variation.
Group I. Fresh fruits or vegetables or their equivalent in canned or dried material (1 pound dried is equivalent to 5 pounds fresh).	2½ pounds.....	½ to 5 pounds.
Group II. Meat, fish, poultry, eggs, or cheese or their equivalent in milk (1 pint milk is equivalent to 4 ounces meat, etc.).	12 ounces.....	6 to 14 ounces.
Group III. Cereals and legumes (dry weight) or their equivalent in bread (¾ pound bread is equivalent to 1 pound cereal).	10 ounces.....	6 to 16 ounces.
Group IV. Sugar or the equivalent in other sweets (¾-ounce sirup is equivalent to 1-ounce sugar).	3 ounces.....	4 ounces.
Group V. Butter or other fats or the equivalent in cream (4-ounce cream is equivalent to 1-ounce butter).	.....do.....	Do.

B. This amount of food insures approximately 3 ounces of protein and 2½ ounces of fat, and gives a total fuel value of 3,300 calories.

4. Method of estimating food requirements for different members of the family:

A. The amount of food required for a person varies with the age, size, and especially with the amount of muscular work done. For practical purposes, the amount of food needed for any member of the family may be calculated from the average ration suggested in 3 A by using the table given below:

Table for estimating food requirement for different individuals.

For a man at hard muscular work allow 1.1 to 1.2 times the average ration.
 For a woman at hard muscular work allow 0.9 to 1 times the average ration.
 For a man at moderate work allow 1 times the average ration.
 For a woman at moderate work allow 0.8 times the average ration.
 For a man at sedentary work allow 0.8 times the average ration.
 For a woman at sedentary work allow 0.6 times the average ration.
 For a boy over 14 allow 1 time the average ration.
 For a girl over 14 allow 0.8 times the average ration.
 For a child between 10 and 14 allow 0.6 to 0.8 times the average ration.
 For a child between 6 and 10 allow 0.5 to 0.6 times the average ration.
 For a child between 3 and 6 allow 0.4 to 0.5 times the average ration.
 For a child under 3 allow 0.3 times the average ration.

5. Methods of checking up the food supply:

A. For practical purposes the food supply may be judged to be adequate in kind and amount if the individual maintains normal weight, has good health, and is troubled by no digestive disturbances.

B. If, for any reasons of health or economy, it is desirable to check up the amount of food to see that the proper amount of fuel

and building material are being furnished, this may be done easily and rapidly by grouping the foods for a day as suggested in 2, and calculating the food value of each group by the use of certain factors, as shown below. (This method will be sufficiently exact in an ordinary mixed diet, where several foods from the same group are used. In a restricted diet, where the foods used are not numerous enough to strike an average for the group each food should be calculated separately from any table of composition).

Group I.—To the weight of the fresh fruit and vegetables add five times the weight of the dried fruit and vegetables used.

(1) The total weight multiplied by 250 equals the number of calories.

(2) The total weight divided by 7 equals the amount of protein.

(3) Practically no fat is supplied by this group.

Group II.—To the weight of the meat, poultry, fish, cheese, and eggs, add one-fourth the weight of the milk used.

(1) The total weight multiplied by 900 equals the number of calories..

(2) The total weight divided by 7 equals the amount of protein.

(3) The total weight divided by 6 equals the amount of fat.

Group III.—To the weight of the cereals and legumes add three-fourths the weight of the bread and bakery products used.

(1) The total weight multiplied by 1,600 equals the number of calories.

(2) The total weight divided by 9 equals the amount of protein.

(3) The total weight divided by 50 equals the amount of fat.

Group IV.—To the weight of the sugar add three-fourths the weight of the sirup used.

(1) The weight multiplied by 1,800 equals the number of calories. This group furnishes practically no protein and no fat.

Group V.—To the weight of butter and other fats add one-fourth the weight of cream used.

(1) The total weight multiplied by 3,400 equals the number of calories.

(2) The total weight divided by 30 equals the amount of protein.

(3) The total weight multiplied by four-fifths equals the amount of fat.

By adding the amount of calories, protein, and fat furnished by each group, the day's total will be obtained. This may be

compared with the average amount needed by the individual (calculated from 4 A), and any deficiencies corrected by changing the amounts of food selected from the different groups.

METHOD OF DEVELOPING LABORATORY WORK.

Have the daily ration given in 3, weighed out, select combinations of foods from each group such as would be used in the average family. Call attention to each group separately and discuss the importance of being able to estimate, in the daily preparation of food, the amount desirable from each group. Have each woman calculate from the average ration the total amount of food needed for her family for one day, using the table given in 4; then have her check up the total number of calories furnished by this amount, using the method given in 5. For home work ask each woman to weigh or approximate the amount of food actually used by the family in one day and compare this amount with the class estimate. Note if the amount of food used from each group falls within the safe limits of variation.

LESSON 2. SUPPLYING THE BODY WITH FUEL.

AIM.

To discuss the amounts of fuel needed by the body under varying conditions, and to show what foods are the best sources of fuel.

POINTS TO BE BROUGHT OUT.

1. Need of the body for fuel foods:

A. Foods which are burned in the body to furnish heat or energy are called fuel foods. The heat or energy thus furnished is used—

(1) To carry on the “unconscious” work of the body, such as circulation, respiration, digestion, etc. This is called the basic energy requirement.

(2) To carry on the “conscious” work of the body, such as is required for various occupations, such as standing, walking, housework, etc.

(3) To keep the body warm.

2. Amount of fuel food needed.—The amount of fuel food needed varies—

A. Principally with the size and activity of the person.

B. Decidedly with the age. Children use up more fuel in proportion to their weight and physical activity than adults do. Older

people use up less, due to a general slowing down of the body processes.

C. Little, if any, additional fuel is needed for mental activity.

3. Method of estimating the amount of fuel needed:

A. The fuel value of foods is measured by the calories. (See Unit XII, Lesson 3.) The number of calories needed per day for any individual may be calculated from the following table:

Table for calculating energy requirements.

Kind of activity.	Calories per pound of body weight per hour.	Kind of activity.	Calories per pound of body weight per hour.
Sleeping.....	1	Moderate exercise.....	1½ to 1½
Sitting quietly.....		Active exercise.....	1½ to 2
Standing.....		Severe exercise.....	3 or more.
Light exercise.....			

4. Foods which furnish fuel:

A. The principal sources of energy are the foods which supply carbohydrate (or starches and sugar) and those supplying fat.

(1) Starch is used in the average diet as the principal source of energy. Comparatively large amounts can easily be used by the body because of the bland flavor and because of the ease and completeness of digestion. The largest amount of starch is supplied by cereals, including flours, meals, breakfast foods, and breads of various kinds. Dry cereals average about 1,600 calories to the pound. A considerable amount of starch is also furnished by the legumes and by potatoes and other starchy vegetables.

(2) Sugars.—These include various household forms of sugars and sirups as well as the sugar found in milk, fresh and dried fruit, or other foods. Sugar is used in the diet both to supply energy and to furnish flavor. It digests more rapidly than other foods; therefore, it is a quick source of heat in the body, but on account of the high flavor and a tendency to cause irritation, it should not be eaten in large quantities. Sugar can more easily be omitted from the diet than any other class of foods since the energy furnished by it can be supplied just as well by the starchy foods.

(3) Fats.—These are the most concentrated forms of energy, a given amount furnishing two and one-quarter times as much fuel as an equal weight of sugar or starch. They are used in the diet to furnish fuel and also to furnish flavor. Fats digest more slowly than either starches or sugars, hence are valuable to give food a “staying” quality and to furnish a sense of satisfaction after eating. When fats are scarce, they may be reduced to the

minimum ($1\frac{1}{2}$ ounces per day), but they should not be entirely omitted. Some kinds of fats contain substances extremely valuable to the body. (See Lesson 5.) Protein foods may be used to furnish some fuel, but their extensive use for this purpose is uneconomical.

5. Effect upon the body of too much fuel food; too little fuel food:

A. When fuel foods are taken into the body, they are digested, absorbed, and burned, furnishing heat and leaving a harmless residue. When more fuel is taken in than the activity of the body demands, it is stored chiefly as body fat and kept in reserve. If at any time too little fuel food is eaten, the body draws upon this reserve of fat and converts it into energy. For this reason people suffering from overweight or underweight may frequently remedy the condition by decreasing or increasing the amount of starch, sugar, and fat in the food.

METHOD OF DEVELOPING LABORATORY WORK.

Have the women select from the foods on display in Lesson 1 the groups which are used principally to furnish energy. The teacher should supply the fuel value per pound of representative foods in these groups, so that the women may be able to compare them as sources of energy. Ask each woman to calculate from the table given in this lesson her own daily fuel requirement according to her activity and to estimate the amount of the different fuel foods necessary to meet her requirement. Compare the number of calories obtained by this method of calculation with the number calculated from the average ration in Lesson 1. Discuss the possible variations in the day's food which may be obtained by increasing the amount used of some fuel foods and decreasing the amount used of others.

LESSON 3. THE PROTEIN REQUIREMENT OF THE BODY.

AIM.

To discuss the amount and kind of protein needed by the body and to show from what foods it may be obtained.

POINTS TO BE BROUGHT OUT.

1. Function of protein in the body:

A. Protein is an essential part of the food because it is the only source from which the body can obtain nitrogen in the proper form, an element necessary for the growth of the body and for replacing the body tissues which are constantly wearing out.

2. Amount of protein needed:

A. The amount of protein needed varies—

(1) Principally with the age and size, since these measure the growth. For an adult, the amount of protein needed daily is estimated as three or three and one-half ounces for a man of average weight. Growing children need more protein in proportion to their size because they must build much new tissue as well as keep the body in repair. With the aged, where the functions of the body are slowing down, the amount of protein should be reduced.

(2) Increasing the activity or exercise does not increase the amount of protein required. A man doing active work does not require any more meat than a man doing sedentary work, provided both have the same weight.

3. Kinds of protein:

A. When protein is digested in the body it is broken up into nitrogenous substances called amino acids, which are used to build up the protein of the body. The amino acids vary in different protein foods, hence the foods may be grouped as follows:

(1) Foods containing "complete" proteins or those supplying all the amino acids necessary to build body protein. These foods are milk, eggs, meat, poultry, fish, cheese, and some legumes, at least soy beans and peanuts.

(2) Foods containing "incomplete" proteins, or those lacking one or more of the amino acids necessary to build body tissues. These are dried beans, peas, lentils, cowpeas, and cereals. It is believed that these may be freely used as sources of protein if some of the foods containing complete proteins are included in the diet. A safe rule is to select one-half the protein from each group.

4. Amount of protein per pound in typical foods (Farmers' Bulletin 824, How to Select Foods):

Meats:	Ounces.		Ounces.
Beef and veal.....	2 to 3	Beans, cowpeas, and peanuts.....	3½
Mutton	2 to 2½	Peas	4
Pork	2	Cereals:	
Poultry and game.....	2 to 2½	Wheat flour.....	2
Eggs	2	Corn meal.....	1½
Milk (per quart).....	1	Oatmeal	2½
Cheese	4	Bread	1½
Cottage cheese.....	3		

5. Effect on the body of an excess of protein:

A. When more protein is eaten than is needed for growth and repair, the nitrogen is eliminated by the body and the remainder burned for fuel or if not needed for this purpose, stored as fat. This is a waste of nitrogen. It is also a waste of money, because protein

foods are our most expensive foodstuffs and it is uneconomical to use more than is needed when cheaper fuel foods would serve as well.

B. Proteins when used in the body are not utilized completely but leave a residue to be eliminated by the kidneys. A diet containing an excess of protein increases the work of the kidneys, and while this is not necessarily harmful it may in time cause trouble if for any reason the eliminating functions are impaired.

C. A large amount of protein, especially that of meat, is undesirable because it may increase intestinal putrefaction, causing sluggishness, headache, or more serious disorders. This is more liable to occur with people leading a sedentary life than those doing hard, physical work.

D. In the process of the digestion of such protein foods as meat, eggs, cereals, and legumes, there are formed certain acids which are neutralized by the alkaline reserve of the body. In order to keep the body safely alkaline, milk, fruits, and vegetables, which supply alkaline material, should be included in the diet.

METHOD OF DEVELOPING LABORATORY WORK.

The foods listed in 4 should be on display with the protein content of each noted. Ask the women to suggest good combinations of food supplying protein and to calculate the amount of each necessary to supply the average protein requirement for one day. Discuss the groups (see Lesson 1) which supply the principal amount of protein in the diet. The teacher should suggest typical menus and ask the class to criticize them as to amount and kind of protein represented.

LESSON 4. MINERAL MATTER NECESSARY FOR GROWTH.

AIM.

To show what minerals are most important for body growth, their especial function in the body, and the foods from which they may be supplied.

POINTS TO BE BROUGHT OUT.

1. Minerals are most important for body growth and repair. The principal minerals to be considered in choosing food are calcium, phosphorus, and iron. Small amounts of others are necessary, but they are certain to be included in sufficient quantities if foods furnishing the three principal mineral constituents are supplied.

A. Calcium or lime:

(1) Calcium is present in the body in a larger amount than any other mineral. It is the principal constituent of the bones and teeth.

(2) A lack of calcium will cause weak bones and bad teeth. The results of a lack of calcium are especially noticeable in growing children.

(3) The average requirement of calcium per person is 1 gram (about $\frac{1}{28}$ of an ounce) a day. The calcium requirement of women is increased by maternity since the mother must meet her own requirements and furnish enough for the growth of the bones of the child, both before birth and for some months after.

(4) Foods which furnish calcium:

(a) Milk is the best source of calcium, especially for growing children. Two and one-half cups of milk will furnish enough calcium for an entire day. Cheese also contains a large amount of calcium.

(b) Egg yolks furnish a fairly large amount.

(c) Fruits and vegetables, especially green-leaf vegetables, such as spinach, lettuce, and cabbage, furnish calcium.

(d) Some calcium is obtained from cereals when the whole grain is used.

B. Phosphorus:

(1) Phosphorus is combined with calcium to form the bones of the body and is also an essential constituent of every living cell.

(2) A lack of phosphorus may cause weak or spongy bones or a general retardation of growth.

(3) The average requirement of phosphorus per person is about 1.4 grams, or $\frac{1}{20}$ of an ounce per day.

(4) Foods which supply phosphorus:

(a) Milk supplies phosphorus in a small amount, but in a particularly good form.

(b) Eggs are high in phosphorus, the yolk containing the highest amount.

(c) Whole cereals supply a considerable amount, but very little is found in "refined" cereals, such as polished rice or white flour.

(d) Green-leaf and stalk vegetables furnish some phosphorus.

(e) Dried legumes are rich in phosphorus.

C. Iron:

(1) Iron is present in the body in a small amount, but is highly important, so much so that babies are born with a store of iron to last for several months. In the adult there is no reserve store, as there is of calcium and phosphorus; hence an adequate daily supply is important. This point should be noted in connection with the diet of the expectant mother.

(2) The function of iron is principally as a constituent of the red corpuscles of the blood which carry oxygen.

(3) A lack of iron causes a lack of red corpuscles in the blood, and ultimately results in anemia.

(4) The average requirement for a man is 15 milligrams a day. Women and children require a slightly larger amount. It is believed that iron is supplied from foods in a much more satisfactory form than inorganic iron taken as a tonic.

(5) Foods supplying iron:

(a) Green vegetables, such as spinach and lettuce, are one of the best sources of iron. Care must be taken that much of the soluble mineral is not lost by discarding the water in which vegetables are cooked. (See Unit II, Lesson 4.)

(b) Dried fruits, such as raisins, dates, and figs, are rich in iron.

(c) Cereals furnish a small amount of iron when the whole grain is used.

(d) Eggs are a valuable source of iron, nearly all of which is found in the yolk.

(e) Meat furnishes some iron, which comes mainly from the haemoglobin.

2. Practical method of checking up on the mineral requirement in the diet.—Since the amount of mineral matter necessary for the day's food is so small, it is not usually practical for the house-keeper to calculate the amount from the composition of the various foods. A practical method of making sure that the diet is safe, so far as a supply of mineral is concerned, is as follows:

A. Calcium.—The amount will be sufficient if a liberal amount of milk is included in the diet.

B. Iron.—The amount is sufficient if the foods in Group I (see Unit X, Lesson 1) do not fall below the minimum, if leaf vegetables like spinach are often used, and if part of the cereals are from whole grain. If it is desirable to increase the amount of iron in the diet, increase the amount of fruits and vegetables, add egg (yolk), and use dried fruits in place of refined sugar.

C. Phosphorus.—If plenty of milk and whole cereals are used the phosphorus requirements will be adequately met.

METHOD OF DEVELOPING LABORATORY WORK.

The teacher should give the class typical menus low in mineral matter, ask for specific criticisms, and have the menus changed to include the foods which will furnish the necessary mineral matter. By the use of tables giving the mineral content of various foods, the exact amount may be calculated, but this is unnecessary. Suggest,

rather, that the practical method of checking up, given above, be used, and that the women should see that they include plenty of the foods mentioned as supplying mineral matter, so that they will allow an ample margin. Explain that there is no danger of their supplying too much mineral. Urge the importance of a mixed diet to assure quantity and variety of mineral matter. Ask for special diets to be planned for a day to meet the mineral requirements of (1) a growing child, (2) an anemic woman.

LESSON 5. FURTHER ESSENTIALS OF THE ADEQUATE DIETARY.

AIM.

To show further the need of wise selection of foodstuffs if the diet is to furnish all of the essentials for normal growth and the maintenance of health.

POINTS TO BE BROUGHT OUT.

1. Even with an adequate supply of fuel foods and building materials the body is not properly fed unless certain foods are included which serve in various ways to regulate the body processes and keep it functioning properly. The following foods must be considered in relation to the diet:

A. Foods furnishing dietary essentials, "fat soluble A" and "water soluble B"—

(1) These are two substances concerning which little is known except that they are of equal importance with other nutrients, and that when they are lacking the body does not grow normally and health can not be maintained properly.

(a) The fat soluble substance may be obtained from milk, butter, cream, and egg yolk. Considerable amounts are also furnished by green leaf or stem vegetables. This substance is one thing that makes whole milk or butter so indispensable for children.

(b) The water soluble substance is generally distributed through foods. Sufficient quantities may be obtained from milk, eggs, whole cereals, legumes, and other vegetables. It will be lacking in a diet which contains large proportions of highly refined products, such as white sugar, very white flour, vegetable oils, and lard.

B. Foods furnishing necessary minerals and acids—

(1) Small amounts of various minerals are necessary to keep body fluids at the proper concentration and to carry on processes

which are essential. These are best supplied from fruits, vegetables, and milk.

(2) Fruits and vegetables also furnish necessary organic acids which are changed during metabolism into alkaline material which helps to maintain the alkaline reserve needed in the body to neutralize acids formed in the digestion of meats, eggs, cereals, legumes, and nuts.

C. Laxative foods—

It is necessary to have in the diet foods that give bulk and stimulate the activity of the muscles of the intestines so that the waste of the body is carried off. If the intestines become clogged, poisonous compounds are formed which may cause serious results. Laxative foods are:

(1) Fruits and vegetables.—The large amount of cellulose present furnishes an indigestible bulk. They also contain certain mild organic acids and their salts, which stimulate intestinal activity.

(2) Whole cereals.—These are valuable for the bulk furnished by the bran or cellulose and also for minute quantities of certain oils and mineral matters which may have a laxative effect.

D. Water—

(1) Water is a most important part of the diet. It makes up a large part of the body tissue and body fluids, acts as carrier of the food and of the waste material, and helps to maintain an even body temperature. Aside from the amount of water taken in our food, it is desirable that a large amount be drunk. Two quarts daily is not too much. It may be drunk between meals or at meals, if care is taken that the food is properly masticated and not "washed down" in large pieces.

METHOD OF DEVELOPING LABORATORY WORK.

Menus for a day may be suggested by the teacher or they may be brought in by various members of the class for criticism as to whether they meet all the needs of a good dietary. Each menu should be corrected in class. The women should then go back to the original grouping of the foods in Lesson 1, and make a list summarizing the substances furnished by each group of foods. The importance of Group I, which is the group most frequently overlooked, will be much more clearly understood by this method.

An exhibit of foods always adds interest and the women may group them according to the classification brought out in the lesson.

For home work, ask each member of the class to check up on the food served to her family for a day, and the amount of water which each member of the family drinks. Is the dietary planned so as to include all of the essentials of an adequate diet?

LESSON 6. THE PLANNING OF MEALS IN RELATION TO THE FOOD REQUIREMENT.

AIM.

To give practical suggestions that will assist the housekeeper in dividing into meals the food requirement for a day, taking into consideration the amount and kind of food to be included in each meal, and the arrangement of the meals.

POINTS TO BE BROUGHT OUT.

1. The general points which the housekeeper must take into consideration, in dividing the food for a day into meals, are:

A. Food requirements of different members of the family, for example where there are children or old people in the family, this will affect the kind of foods served and the arrangement of the meals.

B. The occupation of different members of the family.—This will affect the amount of food served and the placing of the heavy meal at a different time of day. If a lunch is carried by some member of the family, or if one or more meals are eaten away from home, this may influence the time and content of the remaining meals.

C. Regularity in meal times and a regularity in the kind and amount of food served.—Eating regular amounts at regular times helps to promote good digestion.

D. Simplicity in meals.—An elaboration in foods and courses served is unnecessary. It must be remembered that the conventional method of planning meals is largely a habit, and, like many other habits, served as a time saver because, by following certain rules, the housewife is reasonably sure without calculations that she is supplying the right foods to her family. There is danger, however, that many housekeepers will put too much stress on the form of a meal and fail to realize that all necessary food materials may frequently be supplied in very simple meals, rightly varied, and that less time is needed for their preparation.

2. Amount of food for each meal.—For an average family the total number of calories required for the day may be divided into meals as follows:

Breakfast, one-fourth the total amount.

Lunch or supper, one-third the total amount.

Dinner, five-twelfths the total amount.

If a lighter lunch is preferred, the amount suggested for breakfast and lunch may be exchanged.

3. Arrangement of meals.—This depends upon the occupations and ages of the members of the family, the habits and convenience of the home maker, and similar factors.

A. Breakfast.—This meal should be planned with reference to the fuel requirements, the length of time which will elapse before the next meal, and the character of the next meal. Time should be allowed for preparing and eating a suitable breakfast. It is seldom wise for a person to habitually omit the morning meal.

B. Lunch or supper.—The light meal may be served in the middle of the day where there are children in school or adults in business or where the family leads a sedentary life.

C. Dinner.—For adults doing heavy physical labor, the demand for fuel necessitates serving the heavy meal in the middle of the day. For those leading sedentary lives, it can be served in the evening at a time when body and mind are relaxed and the digestion is more easily carried on. For children, dinner should be served at noon; or, if served in the evening, a sufficient length of time should intervene between the meal and going to bed to give time for digestion before retiring.

4. General suggestions for the selection of food for a meal:

A. It is not necessary to have some food from every group used in every meal, provided each group is well represented somewhere in the day's food. This makes it possible to serve fewer foods at some meals and make up the lack at others.

B. The comparative amount of carbohydrate and fat served in a meal has an effect upon the satisfying qualities of the meal. Carbohydrate foods digest quickly and give a sense of satisfaction, but if a meal is principally carbohydrate the sense of hunger soon returns. Fat is more slowly digested and hence gives the meal "staying" qualities.

C. Foods which stimulate the appetite and promote digestion should be placed at the beginning of the meal, and are especially desirable if the remainder of the meal is heavy. Such foods are fruits and fruit juices, light soups, or foods of special flavor.

D. Heavy foods or those less readily digested should be served with foods easily digested. Only one of these dishes, if any, should be served in a meal, and they should not be served frequently lest an undue strain be put upon the digestion.

E. Concentrated foods should be served in small quantities and preferably toward the end of the meal, when the appetite is blunted and there is less danger of overeating. Rich cake, preserves, and candy are examples of such foods.

F. The question of flavor is highly important. A contrast in flavor is desirable. All bland foods or all highly-seasoned foods are not relished in one meal. The same flavor or food should not be repeated too often. Highly-seasoned pickles, relishes, or sauces

will be used only to a limited extent, if each food is cooked carefully to develop its individual flavor.

G. Color.—Contrast in the color of the foods served at a meal is worth attention. Green vegetables, or those of other colors, fruits, yolk of egg, or yellow salad dressing, browned crusts, or simple garnishings may be used to add attractiveness to food.

H. Texture.—No meal should have an overproportion of liquid. “mushy,” or hard foods. With stews serve crisp breads; with a dish such as macaroni, use browned crumbs on top; with soft breads use a crisp salad.

I. Temperature.—Hot foods should be served hot; cold foods served cold, not luke warm. Clinical evidence suggests a danger from excessive use of hot food, and so the drinking of very hot beverages or soups should be discouraged. A contrast in temperature is frequently welcome; cold sandwiches are more relished with a hot soup or beverage than is hot bread.

5. Specific suggestions for each meal:

A. Breakfast.—The usual plan includes fruit, fresh, canned, or dried, as a first course to promote digestion. The cereal used offers a good method of varying the carbohydrate food, and the sugar usually used with it gives energy which is quickly available. A small amount of fat, as butter or cream, or the fat of egg yolk, will give the meal staying qualities. More fuel may be added if the members of the family need it. (See Unit I, Lesson 6.)

B. Luncheon or supper.—This may be the simple meal of the day, consisting of a “one-dish meal” or of a nutritious soup and dessert, or sandwiches, salad, and a hot beverage. This meal offers an excellent opportunity to use left overs. (See Unit IV, Lesson 7.)

C. Lunch basket.—This is a problem in many homes. The general points to be taken into consideration are:

(1) Choice of foods.—Usually these may be sandwiches of meats, cheese, eggs, nuts or various combinations, a meat pie or serving of baked beans, and a crisp vegetable as celery, or some fruit. For a heavier meal cookies or cake may be added, or a dessert such as baked apple or a custard or pudding. Foods which can not be properly packed are out of place in a lunch basket.

(2) A hot dish, such as soup or cocoa, may be carried from home by using a specially made container, or frequently a hot dish may be purchased at school or at the place of business.

(3) Method of packing.—Cleanliness and attractiveness should be considered. Neat containers and careful packing will help to make even a simple lunch taste better.

D. Dinner—

(1) A simple dinner may contain two hot dishes, as a meat or meat substitute and a vegetable, bread, butter, and a sweet dish. This may be varied by substituting salad for dessert and adding a beverage.

(2) A more elaborate dinner may contain a soup, a meat, a starchy vegetable, a green vegetable, or a salad, bread, butter, and dessert. With a heavy meat course, the dessert should be light, such as a fruit whip, gelatin, or ice; with a lighter first course, pudding, cake, or pie may be used. More vegetables may be included in the meal, if desired. There is little danger of supplying too many foods from this group. (See Unit VI, Lesson 8.)

(3) Where a beverage which has food value, such as cocoa or chocolate, is included in the meal, the food value thus supplied should be taken into consideration.

E. The "fourth meal"—

This is a term often applied to refreshments served at social gatherings. It may well be used to include the eating of candy, ice cream, etc., between meals, or any food eaten irregularly. Such a meal may become a habit and frequently leads to over-eating. If growing children need food between regular meal time, a regular amount of simple food should be given at a regular hour. Adults should for the sake of health and economy discourage eating between meals, and if refreshments are served at any social gathering, allowance for this should be made in one of the regular meals of the day.

METHOD OF DEVELOPING LABORATORY WORK.

The estimates made in Lesson 1 for the amount of food needed per day for the family should be used in this lesson. The women should plan for the division of this amount of food into meals for one day, specifying the dishes to be served at each meal and the arrangement of the meals. If any lunches are to be carried from home, these should be included in the plan. Emphasize the possible variations which may be made by selecting different foods from the same groups and varying the amount of food used from each group, being careful to keep the amount within the safe limits. Each set of menus should be criticised by the class as to (1) proper division of calories, (2) choice and amount of foods used, (3) general appearance of the meal, and (4) ease of preparation and of service.

Where laboratory facilities are available, a representative breakfast, luncheon or supper, and dinner should be prepared. If the class is interested, a workman's dinner pail or a business or school lunch should be planned and prepared.

LESSON 7. THE COST OF FOOD FOR A DAY.

AIM.

To give some suggestions as to how the cost of food may be lowered.

POINTS TO BE BROUGHT OUT.

1. It is generally more economical to plan meals for at least a day, or for several days, at one time.

A. It saves time in planning and in marketing.

B. Some foods may be bought in large quantities, thus saving money.

C. Some foods may be prepared ahead, saving time and fuel.

D. It often suggests economical ways of using leftovers.

2. The variety of foods served may be frequently cut down.

3. Economy may be practiced by studying the cheaper and the more expensive foods in each group, and learning how to substitute one for the other.

A. Group I.—Fruits and vegetables:

(1) Fruits and vegetables are in the main interchangeable and may be substituted for each other. When fruits are high, they may be omitted and vegetables used, and vice versa.

(2) When buying fruits and vegetables, their price per pound and the amount of waste should be considered in estimating their comparative economy.

(3) At some seasons and in some localities dried fruits and vegetables are more economical than the fresh product, and may be made just as palatable if properly prepared.

(4) The home garden is usually a means of reducing the cost of fresh fruits and vegetables in season, and the surplus canned, dried, or stored will furnish economical food out of season. It is not economy to entirely omit fresh fruits and vegetables from the diet as is often done. When it is remembered how important these foods are for proper nutrition, the housewife is justified in using them even at a comparatively high cost. The cost can be offset by cutting down on the amount of money spent on less essential foods.

B. Group II.—Meat, poultry, fish, eggs, milk, and cheese:

(1) When these foods are very expensive, many families can cut down on the amount used. Where there are young children, adequate amounts of milk must be supplied.

(2) The amount of meat used by many families can easily be reduced without harm by using any other of the complete protein foods. Economy in using meat may be practiced by selecting less expensive cuts, preparing them so as to retain food value, and extending the flavor by the use of stews, etc.

(3) Eggs are usually expensive, particularly at the colder seasons of the year. The cost may be reduced by preserving them at home at a season when they are plentiful and cheap. (See Unit IX, Lesson 9.)

(4) Skimmed milk and cottage cheese are usually among the cheaper forms of animal protein. These should be used more abundantly to take the place of more expensive protein foods.

C. Group III.—Cereals and legumes:

(1) As a rule the cereals are among our most economical foods, but the price varies according to the form in which they are bought. The ready-to-serve cereals are most expensive, some of them averaging 50 or 60 cents a pound. Cereals in the form of bread come next, while flours and meals and ground uncooked cereals are the most economical form. Unless fuel and time are important considerations, money can generally be saved by buying uncooked cereals and preparing them at home.

(2) Cereals contain some of almost every substance needed by the body. For this reason, when cost is an important item, a very large proportion of the diet may be made up of cereals, and the amount of protein, fat, and sweets reduced. If, however, cereals are scarce and it is desirable to use a small amount their place may be largely taken by foods from other groups.

(3) The dried legumes are economical sources of food. The starchy legumes may be used as sources of fuel or they may be used for the sake of their protein as meat savers. Such legumes as soy beans and peanuts may be more correctly classed with Group II.

D. Group IV.—Sugars and sirups:

(1) The amount used may be cut down, or may be omitted entirely, without injury to health. As generally used sirups are not economical substitutes for sugar, because, on account of the lower sweetening power, larger amounts are used than of sugar. The fruits from Group I, especially the dried fruits, may be depended upon to supply some sugar.

E. Group V.—Fats:

(1) The amount used can generally be reduced. When the fat in meat, milk, eggs, cheese, or other foods is considered, and butter is served at the meal and fats used in cooking, a much larger amount is used than is necessary.

(2) If green-leaf vegetables and milk are limited in the diet, butter should be used for the sake of the fat-soluble substance. If, however, plenty of green vegetables and whole milk or cream are used other fats may safely take the place of most of the butter.

(3) The saving of fats frequently wasted in the home and their use in cooking will be an economy. (See Unit V, Lesson 2.)

(4) Where good cool, dry storage is available the purchase of fats in larger sized containers will often save several cents a pound.

4. Special points in preparing low-cost meals:

A. The low-cost meals usually contain a large proportion of cereals with a small amount of more highly flavored meats, sweets, and fats. If they are to be attractive special care must be taken in the planning and preparation.

(1) Flavor may be supplied from small amounts of highly flavored fruits or vegetables. A variety of pleasing and contrasting flavors is desirable.

(2) A variety of textures is desirable both to make the meal taste good and to make it satisfy. With a large amount of cereals some crisp or hard foods should be included.

(3) Varying the forms in which the cereals are used and the method of preparation will help to avoid monotony in low-cost meals.

METHOD OF DEVELOPING LABORATORY WORK.

Using the same family rations which were calculated in Lesson 1 and used for meal planning in Lesson 6, ask the women to estimate the cost of the foods used, at the market price. Then, in the light of the suggestions given in this lesson, have each group of foods revised to include the maximum amount of the more economical foods. The cost of the foods in the revised list should be estimated and compared with the cost of foods in the original. Discuss in connection with this lesson the use of locally grown products, thus saving cost of transportation, and methods of reducing cost of fuels (Unit XII, Lesson 4). Point out the fact that in estimating cost it is better usually to plan for several days together, so as to take advantage of purchasing in quantities and of left-over foods. For home work, ask the women to keep account of the cost of food for a week for their families, endeavoring to reduce the cost without cutting down the nutritive value of the meals, and compare the daily average with the estimate made in class.

If interested, the women might group the foods available in their community so as to show the way in which they would affect the cost of the dietary.

LESSON 8. PLANNING THE MENU FOR A DAY.

AIM.

To plan a menu for a day which will meet all requirements and which will come within a specified cost.

METHOD OF DEVELOPING LABORATORY WORK.

This lesson should serve as a review of the preceding lessons in this unit. The method used for giving the lesson may be any one of the three suggested below. The teacher should select the method which best fits the needs and ability of the class.

1. Each woman may be asked to plan, on paper, a day's menu for her family, using the estimates for the amount of food worked out in Lesson 1. A specified amount of money should be allowed for each family, this amount to be determined by the teacher from the work done in Lesson 7.

2. The entire class may be asked to plan a day's menu for a family, the number of persons, age, and occupation being specified by the teacher, and a specified amount of money being allowed for the day's food. The class is then divided into four sections, each section being asked to prepare one of the meals already planned. The fourth section should prepare a lunch for an adult or school child, according to the family chosen.

3. If arrangements can be made by which the members of the class prepare and serve a special meal for some occasion it will be just as satisfactory for review work and frequently much more interesting to the class. A church dinner, a club luncheon, or refreshments for a banquet, or some similar occasion will offer the necessary opportunity. The class should make all necessary calculations as to the amount and kind of food to be used and the cost. The actual preparation may be done under the supervision of the teacher.

REFERENCES.

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Farmers' Bulletin 808. How to Select Foods: I. What the Body Needs.

Farmers' Bulletin 817. How to Select Foods: II. Cereal Foods.

Farmers' Bulletin 824. How to Select Foods: III. Foods Rich in Protein.

Farmers' Bulletin 712. School Lunches.

Farmers' Bulletin 717. Food for Young Children.

Office of Experiment Stations Bulletin 185. Iron in Food and Its Functions in Nutrition.

Office of Experiment Stations Bulletin 227. Calcium, Magnesium, and Phosphorus in Food and Nutrition.

United States Food Leaflet: Choose Your Food Wisely. (See note at end of Lesson 6, Unit II.)

United States Department of Agriculture (in cooperation with Women's Committee, Council of National Defense):

The Day's Food in War and Peace.

UNIT XI.

Special Modification of the Diet.

LESSON 1. INFANT FEEDING.

AIM.

To show the principles underlying the proper feeding of infants.

POINTS TO BE BROUGHT OUT.

1. Babies should be fed at regular intervals.

A. Regularity in feeding tends to develop regular physical habits.

B. The digestive system gets regular periods of rest.

C. A more uniform composition of milk is maintained with the naturally fed baby, and the regular stimulation of the breast tends to keep up the flow of milk.

2. Technic of feeding:

A. Length of interval.—Four hours is to be preferred, since it allows a period of rest for the stomach. It requires three hours for cow's milk and two hours for mother's milk to leave the stomach. A three-hour interval may be required in some cases, but it is rarely necessary.

B. Times per day vary with the interval. With four-hour feeding the infant should be fed five times a day until the third month, when one night feeding may be omitted. With the three-hour schedule the night feeding may be omitted sooner.

3. Natural feeding:

A. Advantages of mother's milk are—

(1) It is sterile if the mother is healthy.

(2) There is no danger of contamination.

(3) It is usually adapted in quality and quantity to the needs of the baby.

(4) It is delivered at the proper temperature.

(5) The naturally fed baby is less likely to contract infectious diseases.

These advantages are so great that the naturally fed baby has a much better chance for life than the baby artificially fed. This point should be stressed in communities in which the mothers tend to feed their babies artificially.

B. Keeping up supply of milk.—Most mothers, with proper care, are able to nurse their babies. The following points are an aid in keeping up the supply of milk:

(1) The *diet* should be laxative and of high food value, rich in protein and mineral salts, especially in lime. The amount should be 50 per cent more than she would need if she were not nursing the child but otherwise leading the same life. Milk is a particularly valuable food for her.

(2) She should have sufficient rest and out-of-door exercise. *Fresh air* is very necessary.

(3) *Freedom from worry*.—Worry is a very potent factor in retarding the secretion. This works in a vicious circle, for worry retards the flow, the baby is hungry and cries, and the mother worries more.

(4) Breast should have *regular stimulation* at sufficiently frequent intervals.

C. Amount of milk taken at a feeding can be determined by weighing the baby before and after feeding. This should be done at several feedings and average taken. The average intake is:

Age:	Amount.
1 to 3 days-----	$\frac{1}{2}$ ounce.
1 week-----	$\frac{1}{2}$ ounce.
1 month-----	2½ to 3½ ounces.
3 months-----	4 to 5 ounces.
6 months-----	6 ounces.
8 months-----	8 ounces.

D. Modifying the mother's milk.—In case the mother's milk causes indigestion a little water or cereal water may be given by bottle before or after each feeding, or some milk can be removed from the breast after each feeding, set aside for the cream to rise, skimmed, and the skimmed mother's milk given with the next feeding.

E. Supplementing mother's milk:

(1) *Substituting artificial food* for one feeding increases the total amount of food and gives longer intervals of freedom to the mother. This can be begun to advantage after the third or fourth month with most infants. A complete substitution of artificial food for more than one feeding is not desirable, since the frequent stimulation of the breast is necessary to keep up the flow of milk.

(2) Some artificial food may be given with one or more of the nursings. The advantages are:

(a) Regular stimulation of the breast.

(b) Opportunity to modify the mother's milk.

(c) Mixing with mother's milk increases the digestibility of the artificial food.

4. Artificial feeding (3 to 9 months). (The diet for the baby younger than three months should be planned with the advice of a specialist; after three months the advice of the specialist should be had in all abnormal cases.)

A. Volume of food to be given at a feeding should be the capacity of the child's stomach plus 1 ounce. The following table gives the capacity of the child's stomach at the different ages:

Age in months.	Capacity in ounces.
3	4½
4	5
5	5½
6	6
7	6½
8	7
9	7½

These figures are merely average and are furnished as a guide in determining the amount. The reaction of the child is, however, the final test.

The volume to be made up for a day is found by multiplying the amount per feeding by times per day the infant is fed.

B. Composition:

(1) *Milk* to furnish building material and energy, 1½ ounces of milk to each pound of baby's weight.

(2) *Sugar* to supplement the energy of the milk, one-eighth ounce to each pound of baby's weight. The forms of sugar most desirable are:

(a) Dextrimaltose.

(b) Lactose.

(c) Cane sugar.

(3) *Water or cereal water* added to make required volume.

C. Mixing:

(1) Make up at one time the milk for the whole day. In case the baby is being fed only partially on artificial food, calculate amount for whole day and estimate the amount to be prepared on basis of the proportion of the diet to be given in artificial form.

(2) Measure water which must be sterilized. Measure and add sugar. Be sure it is dissolved. Measure milk; bring to boil unless certified milk is used. Add to water and sugar mixture and mix well.

(3) Divide the full amount among the number of bottles to be filled. Plug the bottles with cotton, cool quickly, and place on ice. At feeding time heat milk to body temperature, remove cotton, and adjust sterile nipple.

D. Care of bottles and nipples is most important in the artificial feeding of baby. Many a baby has been considered unable to digest cow's milk properly when the real difficulty lay in the fact that the bottles and nipples were contaminated or the milk was not handled with sufficient care.

(1) Bottles should have short necks and round corners. They should be thoroughly cleaned with soapy water and a bottle brush and then sterilized by boiling. Extra bottles should be provided for water which should be given between feedings.

(2) Nipples should be thoroughly scrubbed, turned, and scrubbed again. They should then be boiled for a moment and put away in a sterile jar until needed. Because rubber is more difficult to sterilize than glass, the small nipple is better than the large one used on the open-mouthed bottle.

5. Fruit juice (strained orange or prune) may be added to the diet of the baby after the second month. This is especially helpful in correcting constipation. Start with 1 teaspoonful and increase as it seems necessary or desirable.

6. Rate of gain:

A. Six to 8 ounces weekly during the first half of the first year, gradually decreasing to 2 or 3 ounces a week for the second half.

B. An artificially fed baby may gain only half as fast and still be all right. A slow gain is much better than the indigestion that is likely to result from attempts to force greater gain. The slowness in early months is made up later.

C. If the child has a good color, sleeps well, is cheerful, and properly active, a slight underweight is not important. Decided overweight is never desirable.

7. Weaning:

A. Time.—If the milk supply of the mother is normal, weaning should come between the ninth and twelfth month. The mother's milk is not sufficient as the sole source of the food after the ninth month, and some supplementary food, as milk, fruit juice, and cereal, must be used after this time, and with physician's advice may be used earlier.

B. Method.—If the baby has had any supplemental feeding, the weaning is easy, just the gradual increase in the number of artificial feedings, with a corresponding decrease in the number of breast feedings. When the baby has not been taking food from the bottle, she can frequently be taught to take the milk directly from a cup without the use of a bottle.

8. Food from the ninth to the twelfth month:

A. Kinds of food—

(1) Milk, 1 quart, if baby is entirely weaned, otherwise the proportion of a quart necessary to supplement the mother's milk.

Rarely, if ever, will circumstances justify the use of more than a quart of milk.

(2) Decrease the sugar and add the carbohydrate in the form of strained cereal (3 tablespoons cereal flour used in preparation), which may be given with two feedings during the day as mush with spoon, or as gruel in milk.

(3) Fruit juice.—One to 3 tablespoons of orange or prune juice should be given between the two morning meals. This furnishes desirable mineral constituents and substances essential for growth, and helps to regulate the bowels.

(4) Vegetable pulp.—Small amounts (1 tablespoon) of strained vegetable pulp, as spinach or carrot, may be given with one meal during the day.

(5) Egg yolk, soft cooked, may be given occasionally, but is not essential if the other food is sufficiently varied.

(6) Bread.—Stale bread or toast should be given at least once a day for the child to chew upon.

B. Number of meals.—Four daily, four hours apart.

9. Food for the first year:

A. Kinds.—

(1) Continue milk, 1 quart daily. Part should be used on cereal and the remainder may be taken from bottle or cup.

(2) Leave out sugar and increase the cereal as it seems desirable.

(3) Fruit juice.—Continue increasing as seems desirable. Use either before first meal or between two morning feedings.

(4) Use of strained vegetable pulp and juice may be increased. Children may be taught the habit of eating vegetables during this period. Care must be taken to remove all excess cellulose.

(5) Egg yolk, soft cooked, may be used occasionally.

(6) Enough hard bread should be given to exercise the teeth.

(7) Avoid meat, tea, coffee, sweets, and cake.

B. Times per day.—Four times a day, distribution depending upon habits of mother and baby. Usually about four hours apart—breakfast, lunch before nap, lunch after nap, supper—will usually be found more convenient and better distributed than having the baby eat at the noon meal of the family.

METHOD OF DEVELOPING LABORATORY WORK.

If any of the mothers has a baby artificially fed, have the milk prepared as a demonstration. If not, have the milk prepared for an

average infant. The equipment should be that which the mothers should have for the purpose. The following is suggested:

- 1 saucepan.
- 1 white enamel pitcher.
- 1 measuring jar, graduated in ounces.
- 1 large mixing spoon.
- 1 funnel.

In connection with this lesson the class might visit the dairies from which local milk supplies are obtained to see if the milk is procured and handled in a sanitary manner, if it is pasteurized in the bottles, and if the bottles are properly cleaned. If it is not possible for the entire class to go, one or two members may be asked to go and make a report to the class.

Have the women report, if possible, upon the number of feedings, intervals, and amount at a feeding of babies they know personally.

The babies might be brought, weighed, and comparison made of their weight with average for their age.

LESSON 2. FEEDING CHILDREN UNDER SCHOOL AGE.

AIM.

To show the principles underlying the feeding of children from 2 to 6 years of age.

POINTS TO BE BROUGHT OUT.

1. This has been called the most neglected period of childhood, and is the period during which malnutrition is most likely to leave its mark. There is a rise in the death rate among children over 2, and an increase in the amount of malnutrition and diseases resulting from it, such as tuberculosis.

2. General principles involved in feeding:

A. During this period the child nearly doubles his weight.

B. He must have an abundance of material for building bones, muscles, and other tissues as well as fuel to keep the building processes going and to supply energy for his great activity. This means the best of protein and fuel foods, minerals, and the "dietary essentials" for growth.

C. New foods should be introduced gradually, one at a time, and in small amounts at first.

D. Number of meals.—Four daily during the second year and longer with delicate children who can not take sufficient food at a time; three after the second year for normal healthy children. This gives better appetite and healthier digestive systems.

E. Regularity of Meals.—It is bad for the child's digestion to eat irregularly. If food is necessary between meals, it should be given at a regular time.

3. Kinds of food:

A. Milk should be the chief food, a quart, if possible, being given each child every day. At least a pint is essential.

(1) The proteins, minerals, and "dietary essentials" of milk are all very important for proper growth.

(2) Milk has been called a protective food. It makes up for other inadequacies there may be in the diet. Milk powder, skim milk, or unsweetened condensed milk is far better than no milk at all.

(3) Diets lacking milk are likely to lack lime and so to lead to poor teeth and weak bones.

(4) Milk contains little iron and no indigestible residue to give bulk to the feces and prevent constipation. It should therefore be supplemented with vegetables and fruits.

B. Eggs, soft cooked.

(1) A little of the yolk is given at first, gradually increasing the amount until the limit (one a day) is reached.

(2) A very few little children are made ill by egg white. In such cases it must, of course, be omitted.

C. Meat.—If given at all in this period, it should be in small amount, and in tender, digestible form, such as chicken, fish, lamb, tender beef.

D. Cereals and potatoes.

(1) Next to milk, cereals form the most important part of the diet. They may be given well cooked, as porridge, for breakfast and supper, and in puddings as well as in dry bread, toast, and zwieback. The coarser cereals should be strained at first.

(2) Potatoes should be given baked at first. This method of preparation retains the mineral matter which is often lost if potatoes are pared and cooked in water.

E. Fruit juice or pulp.—Orange juice or pulp at first; later baked apple or pear without skins or seeds; then scraped raw fruit.

F. Pulp of vegetables, such as carrots, spinach, and other greens, or green peas. The pulp should be strained at first. It may be served in this form or in soup or broth.

(1) Vegetables and fruit are valuable because of the minerals and essential growth substance contained in them. Iron, somewhat lacking in milk and cereals, is present in abundance in the vegetables mentioned above, but is to a large extent lost if the water in which they are cooked is discarded. It should be used in soup or cooked down and served with the vegetables.

(2) Vegetables and fruit are valuable because they help to prevent constipation. If the food mass moves too slowly through the intestine, bacteria are likely to multiply and form poisons which lead to sluggishness of mind and body even if more obvious poisoning does not occur.

G. Fats.—Children need fat. If they have plenty of whole milk, the fat may be any good butter substitute, but if they have skimmed milk or none at all they need butter. Some children digest olive oil better than milk fat. Not much cooked fat should be given, with the exception of bacon.

4. Amount of food:

A. Typical day's menu for a child of 2 years:

(1) First meal.—Milk, warmed, 1 cup.

(2) Fruit juice or pulp, 3 tablespoons halfway between first and second meals.

(3) Second meal.—Cereal, strained, 3 tablespoons; top milk, 3 tablespoons; milk, warmed, 1 cup; dry toast or zwieback, 2 slices.

(4) Third meal.—Yolk of egg; strained pulp of carrot; toast, 2 slices; milk, warmed, 1 cup.

(5) Fourth meal.—Cereal, strained, 3 tablespoons; top milk, 3 tablespoons; toast or zwieback, 2 slices; milk, warmed, 1 cup.

B. Day's menu for a child of 4 years:

(1) First meal.—Fruit pulp, 4 tablespoons; cereal, 3 to 4 tablespoons; top milk, 4 tablespoons, for cereal; milk, 1 cup; toast, 3 slices (buttered lightly after it cools).

(2) Second meal.—Cream vegetable soup; soft egg; stale bread, 2 slices; plain pudding, junket, or custard.

(3) Third meal.—Milk toast or cereal and milk; baked apple or pear; cup of milk.

METHOD OF DEVELOPING LABORATORY WORK.

Have each woman bring in list of food eaten per day by some child she knows. Compare as to amount with above. Discuss composition of the meal.

Have the women plan and prepare other meals for children.

LESSON 3. FEEDING THE SCHOOL CHILD.

AIM.

To show the kind and amount of food that should be eaten by children from 6 to 16.

POINTS TO BE BROUGHT OUT.

1. It is as important to choose food wisely during this period as during earlier childhood.

A. The results of mistakes are somewhat less serious than in the case of younger children because if the child has had proper food and care up to this time his digestive system has grown constantly stronger.

B. Mistakes, however, retard growth, lessen the power of resistance to disease, and impair both the disposition and mental ability.

C. Inability and dullness in school are often due to an unsuitable diet.

2. The same general rules should hold as with younger children.

A. Meals should come at regular intervals and no food given between meals. If an exception must be made, plain bread and butter or unsweetened cracker should be given at a regular time.

B. New foods should be introduced into the dietary gradually and in small amounts for the first few times.

C. No risks should be taken "just this once" with foods known to be difficult of digestion.

3. The psychology of eating becomes constantly more important with most children during this period. A dislike of particular foods by the parents is quite sure to be inherited by the children.

A. If the father never eats cereal, the son will not do so without a struggle.

B. If the mother dislikes vegetables, most of the children will refuse to eat them.

C. Food should not be talked about at the table. Conversation at meals should always be cheerful and at least occasionally interesting to the children.

D. Such emotions as anger, grief, fear, or even painful embarrassment may interfere seriously with digestion.

E. Attractive service or a little change in flavor will often make an uninteresting dish interesting.

4. Foods to avoid:

A. Tea and coffee are too stimulating and have no food value.

B. Fried foods; pastries, rich cake, and rich gravies should not be given to young children.

C. Nuts should not be given to little children except in the form of a paste.

5. Foods to give:

A. Proteins, lime salts, phosphates, iron, and other minerals to build muscle, bone, and other tissues; essential accessory substances to promote growth and health.

B. Milk contains all of these necessities. Every child ought to have a quart a day. When this is not possible, come as near to this amount as possible and in no case give less than a third of a quart a day. Milk makes up for many dietary deficiencies. With plenty of it there is far less need to worry about the rest of the diet. If the child tires of it, give it in other forms such as cream soups, custards, cocoa, etc.

C. Eggs or meat, once or twice daily.

D. Cereals in porridge and puddings. Bread should be used plentifully.

E. Potatoes are relatively cheap fuel food and are valuable for the minerals they contain.

F. Fruits and vegetables, especially leafy vegetables, supply iron, somewhat lacking in milk and many cereal foods and needed for making good blood, for growth, and for all the activities of the body. Iron and other minerals dissolve out into the water in which vegetables are cooked. Do not throw it away. Fruits and vegetables are useful preventives of constipation and they contain essential substances necessary for growth and for health.

G. Fats.—If children have plenty of milk, good oleo may be substituted for butter, but they must have some fat. An ounce or two a day should be sufficient.

H. Sweets should always be eaten at the end of the meal. They should not be given between meals, since they take away the appetite for more important foods and so encourage an unbalanced diet.

6. Amount of food during the adolescent period:

A. Not only because of the extremely active lives they live, but also because of the profound changes going on in their bodies, boys and girls from 12 to 16 years old need appreciably more food than their parents. Because they need so much, their food should be concentrated, not very much liquid being given with meals. Special care should be taken to make the food attractive for children of this age, so that they will not learn to depend upon highly flavored foods, which furnish no nourishment but which tempt their appetite.

7. Arrangement of meals:

A. The younger children should, if possible, have their heartiest meal in the middle of the day. This is less important with the older ones since their dinner and supper will have to be much alike in order to give them enough food.

B. When luncheon has to be eaten away from home it should, if possible, contain at least one warm dish. (See Unit X, Lesson 6.) If the luncheon is carried from home the selection, preparation, and packing of the food should receive special attention. Makeshift or poorly selected school lunches do not satisfy the child's appetite and

may encourage him in the eating of unsuitable food, such as pickles, cheap candy, fried cakes, etc.

METHOD OF DEVELOPING LABORATORY WORK.

The class may be divided into three sections, one section asked to plan a day's food suitable for a child between 6 and 9 years, another section to plan a day's food suitable for a child between 9 and 12, and the third section to plan a day's food for a girl between 12 and 16, the noon meal in each case (consisting of a lunch) to be carried from home and eaten at school.

The class should be asked to investigate the school-lunch problem in the schools of the neighborhood and to report whether a hot lunch is served to the children at noon, and if not, if there is a possibility of establishing this as a part of the school work. If children from families represented in the class are attendants at these schools, the women may be encouraged to cooperate with the school authorities in establishing a hot lunch.

LESSON 4. FEEDING THE AGED.

AIM.

To show which foods should be used and which avoided in old age.

POINTS TO BE BROUGHT OUT.

1. "Old age" is a period of lowered vitality which comes to different people at different ages.

A. It involves lessened activity not only in the muscles but in all tissues.

B. Both digestion of food and elimination of waste substances by the body tissues are generally somewhat less vigorous.

2. After 50, it is well as a matter of precaution to take fewer risks with food.

A. Less rich foods—pastry, rich cakes and puddings, rich sauces and gravies, fried foods.

B. More care in regard to special foods that disagree with some people:

C. Irregularity is more serious than with younger people.

D. Heaviest meal advisable in middle of the day; light supper.

E. Meat in moderate amount.

3. The total amount of food eaten should be decreased:

A. In people who are overweight, even if no signs of old age are evident.

B. In people over 60, generally because of lessened activity in the tissues. About 10 per cent less food is needed than in an equally active younger person. The amount needed grows still less with advancing years.

4. Protein foods are needed in relatively small amount. The more easily digestible forms of protein should be used.

A. Meat is more likely to be attacked by putrefactive bacteria in the intestine.

B. Meat juices (boullion, beef extract, beef tea) stimulate the flow of digestive juices, and are, therefore, useful at the beginning of a meal or between meals.

5. Bread is more easily digested when well toasted. Hot and fresh breads are likely to ferment and cause indigestion.

6. Fat is digested best as cream, butter and oleo, olive and other salad oils, rather than in cooked form.

7. Much of the indigestion of old age is due to insufficient mastication. If the teeth can not be made good or replaced by artificial dentition, all food must be scraped, minced, or put through a sieve. Bad teeth with the frequent accompaniment of pus formation are now held to be responsible for many ills blamed on digestive disturbances. A good physician or dentist should be consulted in such cases.

8. Drinking an abundance of water is important to assist elimination and so prevent an accumulation of waste products in the body.

METHOD OF DEVELOPING LABORATORY WORK.

Menus should be planned which are especially suited to an older person, taking into consideration—

- (a) Choice of food.
- (b) Amount of food.
- (c) Method of preparation.

A menu should be planned suited to an average family, then changed to show the way in which it may be adapted to an older person.

LESSON 5. FEEDING IN CONSTIPATION.

AIM.

To show the foods most useful in helping to prevent and cure constipation.

POINTS TO BE BROUGHT OUT.

1. Constipation is not a simple thing to be cured only by dieting. It frequently requires the diagnosis of a physician and his aid in its treatment. In all chronic cases of constipation a physician's advice

should be sought. The more common forms of constipation may be cured by strict dieting, and all conditions can usually be helped by a careful choice of food.

2. Wide prevalence and dangers of constipation:

A. Condition may exist even though there is a defecation; food should pass through in 24 hours.

B. Can be detected by taking charcoal tablets or powdered carmine and seeing how many days pass before it shows in the feces.

C. May cause fatigue, headaches, eruptions of the skin, poisoning of the whole system from the absorption of poisons formed by bacteria from the retained food residues.

3. Helps other than diet:

A. Keep the whole body in good condition by baths, proper rest, fresh air, cheerfulness, freedom from worry.

B. Exercise, not only for benefit to general health, but for specific beneficial action on muscles of abdomen.

C. Water drinking, at least 2 quarts a day, and especially a glass or two immediately on rising in the morning. Lemon or other fruit juice may be added to it or a mineral water substituted. Warm water may be taken if cold water makes trouble. Water stimulates the muscles and softens feces.

D. Defecation at an absolutely regular hour every day, preferably immediately after breakfast. Both the early drink of water and the eating of food stimulates the intestinal muscles. Some people feel better if there is a second defecation after one of the other meals also.

E. Each of these suggestions should be followed regularly and consistently. A disregard of any of these may prevent recovery.

4. The diet is important in the most common forms of constipation.

A. Principles involved:

(1) Foods containing an indigestible residue (fiber) give bulk to the feces and stimulate the action of the intestinal muscles.

(2) Foods containing organic acids and salts have the last-named effect.

(3) Some foods have a laxative effect and some foods have a constipating effect upon certain people. In studying the relation of diet to constipation, such effects should be noted and the foods included in or omitted from the diet, according to their action in the specific case.

(4) Certain fats are laxative in their effects when taken in adequate quantities.

B. Foods to avoid:

(1) Foods that are concentrated or have little residue, such as milk, cheese, rice, or sago, should not be eaten in large

quantities, but should be eaten with a mixed diet containing foods in (C) below.

(2) Foods, such as meat, nuts, or legumes, that are likely to be decomposed by bacteria in the intestine, with the formation of poisonous products, should not be eaten at night or not at all in large amount until the constipated condition is under control.

C. Foods to eat:

(1) Fruit juices or fruits, sour milk, buttermilk, fermented milk, kumiss.

(2) Coarse cereals and breads containing bran, coarse oatmeal, rye, buckwheat, dried legumes in moderation, figs, currants, and gingerbread.

(3) Leaf and root vegetables, cellulose (fiber) vegetables, greens, cabbage, brussels sprouts, salad vegetables, carrots, turnips, squash, pumpkin, rutabaga, onions.

(4) Bran or agar, ground up and eaten with cream or mixed with cereal; bran is efficient partly because of its roughness and bulk and partly because of salts it contains; agar chiefly because it absorbs water and so gives great bulk.

D. Effect of the adoption of these suggestions on the whole dietary:

(1) Most of the foods to be avoided are high in food value, and most of those advised are low in food value. The resulting dietary will therefore cause loss of weight unless care is taken. Either an actual increase can be made in the amount of these foods eaten or a small amount of concentrated food, such as butter, oil, or cream sauce, may be added to the regular amount of food to increase the calories.

Example.—If an ordinary generous serving of cabbage is substituted for an ordinary generous portion of rice, the actual energy the body can obtain may be reduced to one-half or even one-fourth. The cabbage may be served with butter or cream sauce or more eaten.

METHOD OF DEVELOPING LABORATORY WORK.

The class should plan a day's food for a person suffering from ordinary constipation. The teacher should estimate fuel value and criticise the plans on this score and on that of supplying the necessary food constituents.

The class should plan or prepare several days' rations, giving enough food for an average adult and suitable for correcting an obstinate case of constipation of the common type.

LESSON 6. FEEDING IN OVERWEIGHT FOR WEIGHT DECREASE.

AIM.

To show how the diet should be regulated when a reduction of body weight is desired.

POINTS TO BE BROUGHT OUT.

1. Rate of reduction:

A. Too rapid reduction is dangerous. Many people are ill for years as a result.

B. Occasionally people who have habitually eaten large amounts of starchy foods and sugar may safely lose weight rapidly for a time on change of diet because this loss represents chiefly a loss of the water which the tissues retain on a diet of this sort.

C. In general, a loss of 2 pounds the first week and 1 pound a week thereafter is safe. More rapid reduction should not be allowed except under the directions of a physician.

2. Drugs and patent preparations.—Never use them. Several have been identified as extremely dangerous substances.

3. Factors involved:

A. Food, exercise, and body weight are interdependent. Much change in either food or exercise results in a change in body weight, but if both are changed proportionately weight will remain the same.

B. Practically all people who are overweight can reduce their weight by proper decrease in their food consumption or taking more exercise or both.

C. A few cases of obesity involve other factors and need special treatment by a physician.

4. Food and its relation to body weight:

A. People who are gaining weight are eating more than their bodies can use.

B. This is true even if they are eating less than some thin people. After weight has been gained, frequently a comparatively small amount of food is sufficient to keep the body in that condition.

5. Exercise and its relation to body weight:

A. The amount of food the body can use depends upon the amount of exercise taken. Therefore it is of no use to eat less in order to reduce the weight if one at the same time exercises less.

B. Increased exercise will not only hasten the weight reduction but will also tone up the whole system and result in better utilization of the food that is eaten.

6. Hunger and its importance in weight reduction:

A. Reduction regimes frequently fail in the end because the patient grows so hungry that when the "cure" is accomplished, a short period

of gorging undoes all that has been accomplished in weeks or months of dieting.

B. Hunger means first of all that the stomach is empty; it does not necessarily mean that the body needs food.

(1) Frequent feeding in small amounts is therefore important to remove the feeling of hunger.

(2) Meals should be attractive in service and in flavor without stimulating the appetite overmuch.

(3) Foods of high food value should be reduced in amount.

(4) Foods of considerable bulk but of low food value should be used.

7. Foods of high food value:

A. The most concentrated foods we have, in terms of the amount of energy or of fat the body can get from them, are fats and oils. Therefore eat less fat, less butter and butter substitutes, less fried food, less fat meat, gravies, salad dressings made from oil or butter, less cream sauce, whole milk, or cream cheeses.

B. Next to fats, the foods high in value are sugar and starchy foods. Therefore eat less sugar, candy, marmalades, jams, preserves, potato, rice, bread, and other cereals.

C. When only a slight reduction is necessary, sometimes one need only eat less fat or less sugar or less of both.

D. Follow the food plan systematically. Find out how much of each food of high fuel value is eaten at meals and reduce that amount. Eat nothing of high food value between meals.

E. If the rest of the food and the amount of exercise taken remains the same, a daily reduction of the fat eaten by 1 ounce or of sugar by 2 ounces will result in a loss of from one-fourth to one-half pound per week in the body weight.

8. Foods of low food value:

A. Of high water content—

(1) Beverages and soups without much sugar, starch, or fat.

Examples.—Clear soups, bouillon, consommé, black coffee, clear tea.

Use these between meals to satisfy hunger, serving with them a small plain wafer if necessary.

B. Of high cellulose (fiber) content—

Use these to give bulk to the meal. Properly prepared and served, they will satisfy hunger without allowing the formation of fat as would equally satisfying portions of foods of higher food value.

Examples.—Root and leaf vegetables served without fat or cream dressing; greens; salads with salt and vinegar or lemon juice or with acid and a little oil or much salad and little dress-

ing; cabbage, cauliflower, brussels sprouts, carrots, turnips, onions, squash, pumpkin.

METHOD OF DEVELOPING LABORATORY WORK.

Have each member of the class write out a typical day's ration for herself, indicating (in cupfuls, tablespoons, or teaspoons, or even in large and small servings) the amount of each food eaten. Then change it to make it a ration on which she would lose weight.

In the light of this lesson consider what foods recommended for constipation would be most useful for a fat person.

LESSON 7. FEEDING IN UNDERWEIGHT FOR WEIGHT INCREASE.

AIM.

To show how the diet should be regulated when a gain in weight is desired.

POINTS TO BE BROUGHT OUT.

1. Rate of gain:

A. A permanent increase in weight is more likely to result from steady gain at moderate rate than from very rapid initial gain which sometimes leads to loss of appetite or indigestion.

B. In emaciation resulting from acute illness extremely rapid gains may be made.

2. Factors other than diet:

A. Fresh air and moderate exercise stimulate both appetite and assimilation. Violent exercise is liable to prevent rather than promote gain in weight, particularly at the beginning of the special diet.

B. Rest, both physical and mental, is important. This is one of the reasons why a vacation is a good time to take a fattening cure. Thin people generally live at high nervous tension, which can almost always be lessened by determined effort.

3. Diet:

A. An increase in weight must be obtained by supplying regularly to the body an amount of food in excess of its daily needs so that there will be an excess to be stored in the body as fat. The diet must be so planned that an increase of food does not cause digestive disturbances. The principles involved in planning this diet are:

(1) Stimulate the appetite. Food served should be attractive in appearance and flavor. A little clear soup at beginning of

lunch or dinner. Little sweet at the end of meal, none between meals.

(2) Eat regularly, whether hungry or not.

(3) Add concentrated foods to the diet. Cream sauce or butter may be served on foods of low fuel value such as carrots, turnips, onions. Eat moderately of cellulose foods with little fuel value. Raisins, dates, nuts may be added to the dessert.

(4) Eat between meals food of relatively high fuel value, but of bland flavor, so that it will not take away appetite for the next meal. For example, a glass of milk or buttermilk, an egg in fruit juice, cocoa not too sweet; 1 to 2 tablespoons of milk sugar which is not sweet may be added to milk or cocoa in extreme cases, but it is expensive and not often necessary.

(5) Take a glass of milk and a cracker or piece of bread and butter before going to bed.

4. Amount of food to be added to regular diet:

A. Observe and record regular diet which probably maintains weight but does not allow gain.

B. Three glasses of whole milk every day *added to* such a diet will generally allow a gain of one-half to 1 pound a week.

C. When fat is plentiful, $2\frac{1}{2}$ ounces added to the daily diet will have the same result; that is, 5 tablespoonfuls of salad oil in the course of the day in salad dressing or after meals, or the same amount of butter or oleo, eaten with bread or cooked with other food.

D. An extra slice of buttered toast (cut thick) or two extra slices cut thin, an added potato, large, with butter or gravy and a large banana or apple or orange will have the same effect.

E. These *must be added* to the regular diet on which weight is maintained.

METHOD OF DEVELOPING LABORATORY WORK.

Each member of the class should study her regular diet for several days, keeping a record of just what she eats and how much (in rounded or heaping teaspoons or tablespoons) of each dish. By arranging this in vertical columns, one for each day, and observing the same order in the foods it will be possible to see whether approximately the same amount is eaten regularly. The foods may be grouped, as bread and butter, cereal, milk or cream, sugar, meats, etc. These records should be averaged and brought to class, and each member asked to indicate what additions would be necessary to change this into a diet on which she would gain weight.

A regular day's ration reported by one member of the class might be prepared in class and the foods necessary for gain in weight added.

LESSON 8. ADAPTING THE MENU TO THE NEEDS OF THE FAMILY GROUP.

AIM.

To show how to plan a menu adapted to the varying needs of a family group and requiring the least time and trouble in preparation.

POINTS TO BE BROUGHT OUT.

1. Where the family is made up of individuals whose diet must be varied, either on account of age or some special condition, it is frequently a problem to the housekeeper to plan meals which will meet the needs of all the family without requiring additional labor in preparing special foods for each member of the family. The problem may frequently be simplified by taking into consideration the following points:

A. A careful study of the food groups and of the points brought out in the preceding lessons of this unit makes it evident that there are some simple, satisfactory foods that may be used by practically every member of the family. Such foods are cereals in some form, milk, fruit, and vegetables. A large proportion of the diet can be made up from these foods. In the case of cereals or fruits and vegetables, some care will be necessary in selection, but, generally, those suited to the special diets will be satisfactory for the normal members of the family.

B. By varying the method of preparation slightly the same food may be made to suit people of varying needs.

(1) The food may be prepared simply, in some form, so that it may be eaten by all.

(2) The food may be prepared by some simple method and then divided, a part being served in this form and the remainder used in the preparation of more highly seasoned dishes or combined with other foods.

C. Special diets in some cases are largely a matter of quantity. This is true of diets for those suffering from underweight or overweight, or diets for the aged. In such cases an average meal may be made to answer all requirements by varying the amount of certain foods eaten.

D. Where there are small children in the family who have their meals at the table with the adults, they should be trained to eat only the simple food which is served to them and not to demand other foods on the table which are more suitable for the adults.

METHOD OF DEVELOPING LABORATORY WORK.

The class may be asked to plan a day's menu for an average family, then show how it could be adapted with the least trouble to the needs

of a family consisting of father, who is overweight; mother, who is underweight; grandmother, one child of school age, and one baby of 2 years. If laboratory facilities are available, the class may be divided into three sections, and each section required to prepare one of the meals of the day's menu.

If the women prefer, each may plan a day's menu for her own family, taking into consideration the special needs of different members. One of these menus may be selected for preparation in class.

REFERENCES.

United States Department of Agriculture:

Farmers' Bulletin 717. Food For Young Children.

Farmers' Bulletin 712. School Lunches.

Farmers' Bulletin 413. Care of Milk and its Use in the Home.

Farmers' Bulletin 808. How to Select Foods: I. What the Body Needs.

Farmers' Bulletin 817. How to Select Foods: II. Cereal Foods.

Farmers' Bulletin 824. How to Select Foods: III. Foods Rich in Protein.

United States Food Leaflet No. 7. Food for Young Children. (See note at end of Lesson 6, Unit II.)

United States Department of Labor—Children's Bureau:

Care of Children Series, No. 4. Milk the Indispensable Food for Children.

UNIT XII.

The Housekeeper and the Food Problem.

LESSON 1. THE HOUSEKEEPER AND THE FOOD PROBLEM.

AIM.

To outline briefly the problems confronting the housewife in selecting food for the family.

POINTS TO BE BROUGHT OUT.

1. There is at the present time an abnormal situation in regard to the food supply of the world as the result of lessened production during the war, and serious interference with the channels of distribution which will be slow in reestablishing themselves.

A. Production.—The countries which been engaged in war are the principal food-producing countries of the world. With the exception of the United Kingdom and Belgium, the European countries produced very nearly food enough for their own needs in normal times. Since war conditions have existed, their production has been seriously cut into by:

- (1) Draining of man power for the army and navy.
- (2) Devastation of large areas in battle.
- (3) Inability to secure fertilizer and agricultural implements.

While we may look to a betterment of this condition as the result of the cessation of hostilities, it will be impossible for several years to increase the stores of certain lines of food. In view of the decreased man power and the chaotic condition of both capital and labor in Europe, it will be difficult to get back immediately to the prewar production of food.

B. Distribution.—The distribution of foods was hampered during the war by the imperative need to reduce tonnage available for shipping food because of a shortage in ships and because over one-third of the world's shipping tonnage was demanded for military purposes. Distant markets, such as Australia, India, and Argentine, were for a long time unavailable. They accumulated stores of food which are now available. It is impossible to tell what the effect of the sudden release of these large stores of food will be on the food market.

2. Foods effected.—The foods which have been most effected by war conditions are the concentrated staple foods which were valu-

able for shipping, particularly wheat, meat, fats, and sugar. With normal conditions as to production, we can look forward to a more immediate adjustment in the vegetable than in the animal foods. The vegetable foods are produced in one season. The animal foods require a longer time for production and to a great extent represent the great food reserves which have been drained as a result of the war. At the present time there is indication of a world shortage of fats. This is being relieved in part by the utilization of certain forms of vegetable fats which have not been previously used for food purposes.

3. America's part in meeting the food situation.—America's part in the international food program is to increase the ordinary surplus of concentrated foodstuffs, especially live stock and fats, so as to have the largest amount possible to share with the countries in need. We can expect great fluctuations in the food market, as the stores of food supplies in the distant countries are made available by the release of shipping from military purposes, so we must stand ready to take advantage of any oversupply of any particular food which may be turned back upon this country as the result of supplies being made available from other countries. If the housewives stand ready to step in in such emergencies, much can be done to prevent sudden slumps in prices which will eventually react to the detriment of all. If the buying power of the housewife is kept flexible it will help us pass from abnormal to normal conditions. During the year 1919 the United States has promised to send abroad 20,000,000 tons of food, an increase of more than 8,000,000 tons than in 1918 with no larger surplus to draw from. This amount of food includes 4,000,000 pounds of dairy products and between 3,000,000 and 4,000,000 pounds of pork products. It is essential that this food be sent or many of the people of Europe may die of starvation. The sending of this food is an international duty.

4. The above food situation brings the housewife face to face with certain definite problems in supplying the food for the family. These are:

A. The obligation and the privilege to use food economically in order to help in feeding all the world.

B. The necessity of maintaining the health of her family by correct feeding under conditions which may cause increased prices of many of the staple foods. Our experience during the war goes to show that the American boys were not up to standard physically. We are coming to realize, as never before, the importance of proper food in maintaining the physical welfare of the whole family.

C. It is probable that the world condition in regard to food is going to mean wide fluctuations in the cost of foods and also with the cost of living uniformly high it is necessary for the housewife to

practice individual economy without running the risk of endangering the health of the family. Many new and unaccustomed foods have been placed on the market. The housewife should have an intelligent knowledge of these. The conservatism of housewives in buying only certain kinds of foods helps maintain high prices. Sometimes others just as good may be had at a lower price. In order to use them she must have an intelligent knowledge of the value of foods, which will enable her to furnish the family the food necessary for health at the lowest possible cost.

5. The following outline has been prepared as a means of helping the housewife to meet the food situation at the present time.

A. Simplification of food habits.—Do not eat or serve food between meals. Serve very simple meals, three courses at most. One-dish meals are practical.

B. Wise selection of food.—Learn to know the needs of each member of your family. Plan your meals to meet these needs. Let your needs and not your whims govern your food habits. Food selection is a science. Study it.

C. Wider range of choice.—Make use of new foods. Wider distribution of choice adds variety to diet and helps keep down prices.

D. Buying of food.—Learn first what food is needed; then buy in such quantities as may safely be stored or used without loss. Plan ahead to save delivery. Study the market and buy the abundant seasonable foods. Conserve those which are scarce here and abroad. Make a budget and keep accounts.

E. Careful preparation of food.—Learn to prepare simple foods well. This means palatable foods with reasonable variations in methods of preparation.

F. Avoidance of food waste.—Watch your garbage pail. Serve only in such quantities as may be eaten. Practice the gospel of the clean plate. Use all left-overs. Waste no food through poor or careless cooking or reckless handling.

G. The saving of surplus foods for future use.—Even a small daily surplus of perishable food should be preserved in some simple way. Preserve, dry, can, or store any large supplies of surplus foods. In her effort to avoid waste the housewife should take into account the value of time consumed in saving. She must remember that time as well as food has a value.

METHOD OF DEVELOPING LABORATORY WORK.

This lesson is planned as a discussion, led by the teacher in order to bring out the problems of the food supply as they may exist in the special community. The housewives should be encouraged to enumer-

ate the special food problems which exist in the community, and they may be then summarized by the teacher, who must have a first-hand knowledge of the situation in order to bring out the local situation by appropriate questions. The material given in this lesson should then be presented in summarizing the situation and in explaining the problems which have probably arisen locally. Under the food thrift portion the women might be asked to add to the points suggested. Since the statement is frequently made that it is impossible to save the waste of food in hotels, because the cost of the extra service required more than offsets the cost of the food they save, the women might be asked to keep account of the amount of time which they expend in using left-overs, or other means of saving food wastes. The length of time required for this is frequently overestimated and can be decreased by using the left-overs in more simple ways.

REFERENCES.

The two books listed below, while not free publications, may be obtained for a small amount, and will be found of great service as general reference material, not only for Lesson 1, but in connection with each unit throughout the course.

Food Guide for War Service at Home. Charles Scribners' Sons. (U. S. Food Administration, in cooperation with the U. S. Department of Agriculture and the Bureau of Education.)

Food and the War. Houghton, Mifflin Co. (Collegiate Section, U. S. Food Administration in cooperation with the U. S. Department of Agriculture and the Bureau of Education.)

LESSON 2. SIMPLIFYING THE STANDARDS OF LIVING.

AIM.

To suggest ways of promoting simpler standards of living in connection with the preparation and serving of food.

POINTS TO BE BROUGHT OUT.

1. A rational standard of living is one which provides for the reasonable needs of the family and maintains efficiency. Standards are too often influenced by competition, a desire for show, or by social demands, until they become unnecessarily complex. In many families the adoption of a simpler food standard would satisfy the needs of the individuals just as well, and by saving time and food, help to lower the cost of living.

2. The labor shortage as the result of the war has affected the home in three ways:

A. Women have been forced to combine with their home duties new and unaccustomed tasks.

B. Labor ordinarily available has been withdrawn from the home.

C. Industrial demands, higher cost of living, and in some cases the absence of the wage earner have taken the home maker into industry, in many cases forcing her to combine industrial work outside the home with home making.

3. As a result of this condition there has come to women an increased realization of the value of their time. In order to complete all the outside work demanded of her and at the same time give efficient care to her house it has been necessary to:

A. Eliminate nonessentials.

B. Simplify essentials.

C. Study essential operations so as to carry them out in the most efficient way.

4. Since so large a share of the time the woman spends in household duties is used in food preparation, it is especially important that the above principles be applied to food preparation. Simpler food standards involve not only the adoption of simple meals but also the simplification of service and the most efficient arrangement of equipment, so as to save time in the preparation, service, and the necessary cleaning after the meal.

A. Simpler meals include:

(1) The selection of simple foods which supply adequate nutrition at least cost, and the preparation of these foods in simple, palatable ways which conserve their food value.

(2) The use of fewer foods at a meal. A certain amount of variety is important, but it is unnecessary to serve foods which duplicate each other.

(3) Training the members of the family to eat sensibly and to like plain foods. Catering to the likes and dislikes of various members of the family often means food waste, and requires an unnecessary amount of time in the preparation of meals.

(4) The avoidance of high-priced foods out of season, unusual foods which are costly on account of their rarity or the distance over which they must be transported, and foods which on account of flavor command a high price out of all proportion to their nutritive value.

B. Simplification of service includes:

(1) Fewer courses.—Many families can make a more frequent use of one-dish meals.

(2) Elimination of unnecessary dishes and silver.—While it is desirable to use sufficient dishes so that the food may be served neatly and attractively, frequently both dishes and silver are used which could easily be eliminated. Service plates, extra side dishes, and special silver for special foods are examples of these.

(3) The use of a type of silver and china which does not require a great deal of care in handling.

(4) Simple table linen.—Frequently the substitution of smaller for larger napkins or the use of paper napkins will mean a saving in time for laundering. Luncheon cloths or doilies may be substituted for large cloths. Excessive handwork on table linen is another factor which requires much time for its proper laundering.

(5) Simple decorations and garnishings.

(6) Planning meals that can be served, if necessary, by some member of the family, with the least effort, and the fewest number of trips away from the table. (Suggest the use of a wheeled tray in this connection.)

C. In simplifying both the preparation and serving of meals the efficient arrangement of equipment is important, especially that of the kitchen. Some points to be considered are:

(1) Size of the kitchen.—This is determined principally by the number of workers who use it and the kind of fuel used. Too large a kitchen wastes time and energy in walking from one point to another and in cleaning the unnecessary floor and wall space. Too small a kitchen does not give sufficient space for equipment or for the worker, and when a coal or wood stove is used it is liable to become overheated.

(2) The kitchen walls and floor should be finished so as to facilitate easy cleaning.

(3) There should be sufficient window space for good light, placed so as to obtain cross ventilation. The windows should be high enough to allow for table or sink room below.

(4) Arrangement of doors should be planned to furnish ready access to dining room, pantry, or storage room, and out of doors.

(5) Working surfaces should be arranged at such a height that stooping on the part of the worker is unnecessary. If tables or sink are too low they should be raised by placing wooden blocks under the legs.

(6) The kitchen equipment should be grouped so as to take the least amount of walking necessary, either in the preparation of food or in the clearing away after meals. Equipment should be grouped around three centers—the preparation center, the cooking center, and the clearing center. Arrangements should be made for the storage of necessary supplies and utensils in connection with the center where they are used.

(7) The supply of kitchen utensils of the proper type, shape, size, and material should be adequate for the work in hand. The housewife needs good tools if she is to do efficient work. There are many tested labor-saving devices which she may use,

the choice depending upon the amount of money she wishes to spend and the kind and amount of work to be done. No tool is a labor-saving device if its care requires an excessive amount of time or if it is used so infrequently that its storage becomes a burden and takes up space better devoted to other things.

(8) Each piece should be kept in good working order.

(9) Keep utensils in place when not in use.

(10) Be economical in the use of both dishes and cooking utensils, thus saving dishwashing.

METHOD OF DEVELOPING LABORATORY WORK.

Ask the women to plan a simple meal suitable for guests which may be served by the hostess with the least trouble and the fewest number of absences from the table.

Ask each woman to make a rough drawing of her kitchen and to point out any improvements which could be made in the arrangement of its equipment which would lessen the labor required for preparing a meal and cleaning the dishes.

It would be of interest if the teacher could have on display some good labor-saving devices for the kitchen. (These might be borrowed from local merchants.) Ask for a discussion of these, and suggestions from the women as to which might be grouped as essential and which as desirable. Have the women report upon any special devices, either bought or made at home, which have proven to be time or energy savers.

Have each woman estimate the length of time required to prepare and clean up the different meals. Have them work over menus and arrangements for preparation and service of meals to see if this time can not be reduced. Suggestions from each other will help in this. Some time should be devoted to the discussion of the meal which must be prepared in a hurry.

REFERENCES.

United States Department of Agriculture:

Farmers' Bulletin 607. The Farm Kitchen as a Workshop.

Farmers' Bulletin 927. Farm Home Conveniences.

Separate 646, Yearbook, 1914. The Selection of Household Equipment.

LESSON 3. SELECTION OF FOOD FOR BODY NEEDS.

AIM.

To give general information as to the different kinds and amounts of food needed by the body and to apply this information in the selection of food for a day.

POINTS TO BE BROUGHT OUT.

1. A knowledge of foods is the first step in the wise selection of food and in meal planning. Such knowledge is necessary in—

A. Selecting the kinds of food the body needs so that no essential food is omitted and no unnecessary duplication is made.

B. Selecting the amount of food needed so that the body is neither undernourished nor overfed.

C. Substituting other foods for those that are scarce or for those that are high priced so that the substituted foods may maintain health and efficiency.

2. Classification of foods.—Foods may be classified in five groups:

A. Fruits and vegetables.

B. Protein-rich foods.

C. Starchy foods.

D. Sugar and sugar-containing foods.

E. Fats.

3. Use of these foods in the body:

A. These foods are used in the body to furnish:

(1) Fuel (or energy).

(2) Building material.

(3) Body-regulating substances.

(4) The two "dietary essentials" for normal growth and maintenance of health.

4. Foods which furnish fuel or energy:

A. Most of the energy should be supplied by starchy foods, such as—

(1) Cereals, such as breakfast foods, barley, corn meal, rice, or hominy.

(2) Bread of various kinds.

(3) Dried peas, beans, and lentils.

(4) Vegetables rich in starch, as potatoes.

B. Some of the energy should be supplied by foods rich in fat, such as: Whole milk, cream, butter, eggs, fat meat, meat fats, and oils, or food rich in oil.

C. The meals are more palatable if some energy is supplied by sweet foods.—Sweet fruits (fresh and dried), honey, molasses, sirups, sugar, jams, jellies and preserves, candy.

5. Foods which furnish building materials.—There are four important building materials which must be supplied from the food.

A. Protein:

(1) Some protein should come from the animal foods.—Milk, eggs, cheese, and meat.

(2) The remainder can be supplied from these foods: Cereals, breads, dried peas, beans or lentils, and nuts.

B. Lime:

(1) The most important sources of lime are milk, cheese, and eggs.

(2) Some lime can be supplied by leaves and stems of plants, as spinach, celery, lettuce, cabbage, onions, and Swiss chard.

C. Iron:

(1) Iron may be obtained from green vegetables, eggs, meat, and cereals (when the whole grain is used).

D. Phosphorus:

(1) Phosphorus is supplied by milk, cereals (when the whole grain is used), eggs, dried peas, beans and lentils, and meat.

6. Foods which serve as body regulators:

A. Laxative foods.—Fruits and vegetables, cereals containing the whole grain.

B. Foods furnishing minerals, acids, or flavors.—Fruits and vegetables.

7. Foods containing two substances essential for growth and health, variously designated as "dietary essentials," "vitamines," "food hormones," "growth substances," and "accessories." These substances have been called by McCollum and Kennedy "fat soluble A" and "water soluble B" because of their characteristic solubility in fats and in water, respectively.

A. The experiments of McCollum and his associates have shown that "fat soluble A" is found in considerable amounts in milk, butter, cream, eggs, cod-liver oil, and glandular organs.

B. Smaller amounts are in leaves and stems of plants, as spinach, chard, dandelion greens, cabbage, onion, and celery.

C. The following foods are practically free from "the fat soluble A": Bolted flour, degerminated corn meal, polished rice, starch, sugar, and glucose.

D. "Water soluble B" is found in practically all ordinary foods and in considerable amounts in milk, eggs, meat, cereals (when the whole grain is used), peas, beans, and lentils.

8. Unit of measurement for foods.—The unit of measurement for the fuel value of foods is the calorie which represents the amount of heat necessary to raise 1 kilogram of water 1° C. A gram of pure protein, starch, or sugar furnishes 4 calories; a gram of pure fat furnishes 9 calories, or two and one-fourth times as much.

9. Number of calories needed a day.—The amount of food needed varies with the age, size, weight, and muscular activity of the person. (See Unit X, Lesson 2.)

A. For the average man (154 pounds):

	Calories per day.
At a sedentary occupation-----	2,000-2,800
Standing or walking-----	2,700-3,000
Doing moderate muscular work-----	3,000-3,500
At severe exercise -----	4,000-6,000

B. For the average woman (128 pounds):

	Calories per day.
At a sedentary occupation-----	2,000-2,200
Standing-----	2,200-2,500
Doing moderate muscular work-----	2,500-3,000

10. Division of calories:

A. *Protein* should supply about 10 to 15 per cent of the total number of calories.

B. *Starches and sugars* together may furnish about 60 per cent of the total number. Sugar may furnish 10 per cent or less.

C. *Fats* should furnish about 30 per cent of the total number of calories.

11. There are no definite measures of the amount of mineral substances or the amount of the two "dietary essentials" necessary. Since they appear in relatively small quantities in most foods, a well-mixed diet should be used to make sure of obtaining a sufficient quantity for proper nutrition.

METHOD OF DEVELOPING LABORATORY WORK.

Have typical servings of the following foods shown with the number of calories contained indicated (similar foods may be substituted):

(a) Orange, grapefruit, apple, cabbage, lettuce, carrots, tomatoes, corn.

(b) Meat, fish, skim milk, cheese, eggs, peas, beans, nuts.

(c) Corn bread, yeast bread, rolled oats, grape nuts, corn flakes, rice, grits, potatoes.

(d) Cane sugar, sorghum, maple sirup, corn sirup, honey, figs, dates, raisins.

(e) Butter, oleomargarine, cream, vegetable oil, cooking fat.

Have the women select the food for a day from the above, estimating the amount and keeping in mind that all groups should be represented, without a preponderance from any one group, and that the members of the family must be considered in selecting the foods. Calculate the calories in the day's food selected and suggest how they should be distributed among the meals of the day. Have the women suggest other combinations for criticism.

REFERENCES.

U. S. Department of Agriculture:

Farmers' Bulletin 142. Principles of Nutrition and the Nutritive Value of Food.

Farmers' Bulletin 808. How to Select Foods; What the Body Needs.

Farmers' Bulletin 817. How to Select Foods; Cereal Foods.

Farmers' Bulletin 824. How to Select Foods; Foods Rich in Protein.

U. S. Department of Agriculture (in cooperation with Women's Committee, Council of National Defense):

The Day's Food in War and Peace.

LESSON 4. FUEL SAVING IN FOOD PREPARATION.

AIM.

To show the importance of saving fuel and to suggest methods by which fuel may be saved in the home preparation of food.

POINTS TO BE BROUGHT OUT.

1. As a nation a more economical use of fuels is desirable because—

A. Increased demand as the result of war activities has used up available surplus.

B. The experience of the winters of 1917-18 shows the necessity of having on hand a fuel reserve. While the conditions were then very abnormal, such conditions may be brought about by a temporary emergency.

2. As individuals a more economical use of fuels is desirable because of—

A. Direct money saving.

B. Indirectly there is a saving since the increased supply of fuel tends to decrease the price.

3. Kinds of fuel available:

A. Coal is most important because:

(1) It is most generally available.

(2) It is easily adapted to both home and industrial uses.

(3) It is easily transported.

(4) It is used not only as fuel in itself, but is used in the manufacture of other fuels, as gas and electricity, when that is generated by means of the steam dynamo.

B. Wood.—Not so compact and limited in availability.

C. Artificial and natural gas.

D. Electricity.

E. Kerosene.

F. Gasoline.

G. Acetylene.

NOTE.—Modifications of equipment are making it possible to use these fuels for almost all industrial and home purposes. The use of the form of fuel most available and cheapest in a given community should be encouraged.

4. Care and management of stoves so as to save fuel in food preparation:

A. Coal stoves and ranges—

(1) Keep the stove clean. A sooty stove wastes one-fourth the fuel. The inside of the top of the stove and under the oven

should be frequently cleaned. Keep the chimney cleaned. Empty the ash pan daily. A pan filled with ashes and cinders hinders the draft and injures the grates.

(2) Keep in repair. See that all dampers work properly, and that there are no warped or broken sections in the stove to admit air.

(3) Fire properly. Learn how to use the dampers to control the amount of heat.

(4) The lower damper in the ash-pit door is used to furnish a moderate amount of air from below and to consume the gases. The ash-pit door should not be opened to furnish a draft because it admits more air than the fire needs and much of the heat goes out the chimney.

(5) The upper damper just above the fire controls the rate at which the fire burns. Close it when starting a fire; open it slightly if the fire burns too rapidly.

(6) The oven damper directs the heat around the oven for baking. Open it to start the fire, then close it to heat the oven and to keep hot air from going up the chimney.

(7) The check draft damper should be opened when the fire is to be kept over night, or when the store is to be cooled quickly.

(8) The stovepipe damper controls the rate at which the hot air goes up the chimney. Open it to start the fire; close it to slow down the fire.

(9) Keep a deep fire, up to the top of the oven but not running over on it. A thin fire wastes heat.

(10) To keep fire through the night, the fire box should be filled solid, but not touching the lids. Close lower drafts and open check draft.

(11) Don't use a big fire for a small amount of cooking. Learn to gauge the amount of fuel required so that after the cooking is finished there is no waste heat.

(12) If wood is locally plentiful, use it to save coal. It may be mixed with coal or may be used alone. When burning wood alone in a coal stove the grate should be partially covered to reduce the draft.

B. Gas stoves.—

(1) Burners should be kept clean. When they become clogged there is incomplete combustion of the gas and its full heating value is not utilized.

(2) Burners should be so arranged that the tip of the flame touches the bottom of the cooking vessel. Since the short flame is more economical of gas this means the distance from the burner to bottom of vessel in position should be about 0.6 inch.

(3) If openings in burner are so close that two flames strike each other there is poor combustion. This is less likely to happen in drilled than in slotted burners.

(4) Solid stove tops are to be avoided since they conduct off the heat. The idea that they are economical is erroneous.

(5) The better insulated the oven the less gas required, remembering there must be free ventilation in that portion of the oven in which the gas is burned.

C. Kerosene and gasoline—

(1) Keep stoves clean and burners or wicks in good condition.

(2) Keep the flame turned low when a moderate heat will serve.

(3) Always have blue flame. A luminous flame indicates incomplete combustion of the fuel.

(4) In general the better grades are more economical than the cheaper.

D. Electrical cooking equipment—

(1) Special small pieces are convenient but rarely economical. The smaller pieces used at the table use less fuel than would be required to heat a large kitchen stove, but it is poor fuel economy to use them when the range must be heated for other purposes.

(2) Electric stoves are capable of greater development in fuel saving than gas stoves because the heating unit as well as the cooking portion may be insulated to prevent loss of heat. An electric stove should have a well-insulated oven and sunken, well-insulated heating units.

5. Kitchen equipment which will save fuel:

A. Fireless cooker.—One of the best fuel savers. Especially good for foods requiring long slow cooking.

(1) Commercial fireless cooker in various forms and sizes.

(2) One may be made at home with little expense which will do satisfactory work. It should be properly insulated and lined with noninflammable material to avoid danger of fire.

B. Pressure cooker.—Saves fuel because the high temperature obtained cooks food in a shorter time than by ordinary methods.

C. Steamer.—This permits several foods to be cooked at the same time over one burner.

D. Double or triple container which fits over one burner.

6. Choice of utensils which are good conductors of heat. Some materials conduct the heat more rapidly than others. They should be free from soot, since soot is a nonconductor of heat.

7. Methods of cooking which will save fuel:

A. Group foods so that several requiring long cooking may be prepared at the same time with the same amount of fuel. Some foods may be cooked in quantities and reheated as needed.

B. Have regular baking days, when several foods may be cooked in the oven at the same time.

C. Serve plain foods cooked simply. Meals requiring elaborate methods of preparation are often food and fuel wasters.

D. If a heating stove or a furnace is in use, it may be used to cook foods requiring long, slow cooking.

E. The scale which accumulates in the bottom of the tea kettle after continued use for heating water is a nonconductor of heat. Water heats very much less quickly in such a kettle. This scale should be removed.

METHOD OF DEVELOPING LABORATORY WORK.

If possible have in the equipment a commercial fireless cooker, a home-made fireless cooker (directions for making may be obtained from the U. S. Department of Agriculture Bulletin No. 771), a steamer, and some types of cooking utensils which are desirable. Be sure each of these is used in the work some time during the course. Have the women tell of the ways they use them at home and calculate the time and fuel so saved. Base the lesson on the fuel in common use in the neighborhood. Have the women bring in fuel costs for families of definite sizes. Determine the most economical fuel for use in the neighborhood, taking into account—

- (1) Cost of equipment.
- (2) Cost of fuel.
- (3) Cost in convenience.
- (4) Cost in time.

Where necessary, teach the women how to estimate the cost of fuel by measure of coal and reading meter for gas and electricity.

Have the women in their work keep account of time required to heat same amount of water in vessels of different shapes, as tall vessel with small base compared with vessel of same capacity with larger base. Emphasize importance of broad base exposed to heat and the loss of heat from the tall exposed sides.

Estimate the difference in time required to heat a kettle of water before and after the removal of scale.

Discuss the fire hazards in a kitchen.

REFERENCES.

The U. S. Department of Agriculture :

Farmers' Bulletin 771. Home-made Fireless Cookers and Their Use.
Circular 79. Emergency Fuel from the Farm Woodland.

LESSON 5. MARKETING.

AIM.

To teach the women ways of applying practical economy in the purchase of food.

POINTS TO BE BROUGHT OUT.

1. The food budget:

A. Importance.—The food budget is fundamental to economy in food buying. The proportion of the income which can be allowed for food must be established in order that unwarranted food expenditures are not made at the expense of other necessities and yet that the family may live as well in regard to food as the purse admits.

B. Proportion of family income allotted to food.—In general the lower the family income the larger will be the proportion of it needed for food. The proportion varies with—

- (1) The size of the income.
- (2) The composition of the family.
- (3) The position of the family in the social group.

C. Methods of apportioning food expenses—

(1) Fixed income in weekly payments.—In this case, the food expenses for a week should be allotted in a definite proportion to the weekly wage payment.

(2) Fixed income in monthly payments.—It will be found more definite to apportion the monthly allotment into weekly amounts, since control over expenditures is made easier if kept within short-time periods and periods of equal length.

(3) Fixed income at irregular times.—Care must be taken to reserve resources for less productive seasons and particularly to figure food allotment per week sufficiently low to insure its continuation the year around. A definite proportion of the total yearly income should be taken and divided into weekly amounts.

(4) The week's food allotment may be still further divided into daily allotments or else into allotments to cover breakfasts, luncheons, and dinners. Generally after allowance has been made for the essentials, such as milk, cereals, and breadstuffs, for which the amounts can readily be fixed, only the variables are left to be adjusted for each meal.

D. Advantages of a food budget:

(1) With a weekly or daily allotment, the housekeeper is no longer uncertain in her purchasing. She knows at once to what range of price she must limit the "variables" for each meal, such as green vegetables, meat, or protein-rich foods and desserts.

(2) She will know when she has managed so carefully that a special desire can be gratified without running behind, and she

will know when some unusual demands not counted upon have to be met by more than usually good management.

(3) Her judgment in marketing under these circumstances is much quicker and more accurate than when she goes to market either waiting to be tempted by something or with the general idea of doing the best she can.

(4) Definite standards remove worry and bring more satisfactory results in economy. They aid the housekeeper in knowing the limit of her spending power before she arrives at that limit.

2. The keeping of accounts:

A. Importance.—Keeping accounts or checking up is quite as important to food economy as making a budget. Although marketing may be done upon the basis of a detailed budget, one trip should suffice for several days' supplies, and accounts are helpful to keep the various allotments separate.

B. Methods of keeping practical accounts.—Many people find keeping accounts in books too troublesome and have devised substitutes:

(1) One method is the use of a food purse or a purse containing only the funds for food.

(2) A second way is a package of envelopes, each containing the money for one allotment, be this milk, meat, etc., or dinners, luncheons, etc.

(3) A third way is to subtract each day's food expenditures from the amount available for the week. The remainder each day shows the funds still available. Thus:

\$15.00=weekly food allowance.

1.50=Monday (spent).

13.50

2.30=Tuesday (spent).

11.20

(4) Another way is the reverse of this. The addition of the daily expenditures either as a whole or by allotments, the footing showing what has been spent to date. Thus:

\$1.50 spent Monday.

2.30 do do

3.80 spent by Tuesday.

1.70 do on Tuesday.

5.50 spent by Wednesday.

C. Charging purchases to an account.—The advisability of running accounts varies enormously with different people, different stores, and different incomes. Some advantages are—

(1) The convenience of not handling change constantly either at the stores or at the door, with its many irritations and small errors and losses.

(2) The fact that it is very difficult to keep account of these transactions in the interruptions and extreme divergence of activities in home life.

(3) Having an account establishes a fundamental business relationship between buyer and seller that tends to greater responsibility on both sides.

Some of the disadvantages are—

(1) Too often it is planned to conceal an actual financial shortage.

(2) With many people it induces extravagance in buying because payment is postponed.

(3) The market that carries accounts charges such prices to its clientele as will cover the losses from postponed payments and bad debts. One device for meeting this difficulty is to allow a discount for prompt payments of accounts.

D. A variation of the charge account is when the purchaser makes a deposit to the dealer at the beginning of the month and purchases are charged to that deposit. The milk tickets bought in advance are a modified form of this. This obviates the difficulty of enhanced prices.

3. Selection of markets:

A. On the selection of markets depends much of the success in economical buying. The grade of goods and the service a market offers vary with the clientele to which it caters. In some markets it is almost impossible to buy the wholesale but less expensive varieties of fresh market products. Buying from a market of this sort keeps many people buying beyond their means and using more fancy grades than are necessary for their standard of living and for adequate nutrition. The pleasure derived from indulgence in such varieties and grades is perfectly legitimate but not at the expense of more essential factors. Unfortunate also is trading in a market where the selection is too small and does not give opportunity for the full variety of products within the purchaser's price range.

B. Reliability is another matter of importance to be considered in the selection of markets. This applies not only to the quality of the goods for sale but equally to such matters as the manner of weighing and measuring, sanitation and cleanliness, and candor in making and keeping promises.

C. Nearness is a further factor in economic buying that is important in the selection of markets. It saves the buyer's time, tends to bring more prompt service, helps in the ready correction of occasional errors, and is important in emergencies. Many buyers in seeking monetary advantages fail to take other values, such as time, into account. In this connection the cost of trading in too large a number of markets for different items is apparent. "Bargain buying" in a distant market must have positive advantages to offset its disadvantages.

4. Prices and economical marketing:

A. Since fair-price lists have been published the consumer is spared much costly effort in the matter of assuring herself on the prices she is asked to pay. Departure from these may be due to—

(1) Differences in the grade of goods purchased from those on which a price is quoted.

(2) Additional services rendered by some markets in making sales, the cost of which is added to prices.

(3) Poor purchasing ability on the part of the dealer in securing the goods.

B. The quality or grade of goods purchased is often inferred from prices asked, instead of judging the price to be high or low according to the quality of the goods. The dangers of inferring grade from price needs no further comments.

C. Attractiveness is a factor in quality from the standpoint of the grocer. The price is higher for the attractive product. Often a cheaper "quality" has just as much food value. For instance, broken rice and macaroni, prunes of small size, etc., are equal in food value to goods in more perfect and attractive forms.

D. Economical buying also must recognize that the lowest priced article is seldom the most economical one to buy.

5. The market order.—The order is an important factor in economical marketing. The purchaser's list should be definite but not so rigid that she can not adjust herself readily to the day's prices, especially of perishables. It should be complete before it is offered and items should be grouped. Errors are costly as are multiple orders and deliveries. Their costs are sooner or later added to the prices asked and these additions to price do not fall upon the purchaser alone, but upon the whole clientele of the market. Ordering or planning the orders for several days in advance saves time and effort.

6. Time of marketing.—The time of marketing offers several considerations that effect economy. If the purchaser takes the time to go to market in person to have a choice of the market's best she should get the full benefit of this time and effort by going early. If she

does not need as complete selection or things entirely in their prime the closing hours often offer economies in salvage prices.

7. Factors to have in minds in economical buying are:

A. Food value (see Unit XII, Lesson 3).—This differs widely in foods having the same cost. All of the food constituents essential for proper nutrition must be provided in the diet, but the buyer should know that certain forms of each are higher in price than others. Certain meats, fruits, and vegetables are often higher priced than their actual food value warrants. Remember that we are justified in paying high prices for certain foods on account of certain definite contributions in the way of food value or flavor, but too much emphasis should not be placed upon flavor alone as is frequently the case.

B. Cost of preparation:

(1) Fuel (see Unit XII, Lesson 4).—Two phases of the use of fuel in the preparation of food should be considered in planning purchases of food.

(a) The *amount* of fuel used in preparation.—Some foods requiring longer cooking may be needed in the diet for variety but might well be bought ready to serve unless the organization of the household makes the use of fuel for such purposes economical. (See 8, Ready to Serve Foods.)

(b) The *particular application of heat* for the day's supply of food in relation to other household activities.—In the case of wood or coal stoves, particularly if laundering, preserving, bread making, or other tasks requiring a hot stove are in progress, foods requiring simple handling but long cooking may be planned, thus making the fuel consumed serve a double purpose.

(2) Time.—The amount of time involved in the preparation of food and the value of the housekeeper's time must be considered. Foods which require long and involved processes in preparation should either be omitted from the diet or bought ready-to-serve unless the value of the housewife's time is such that it may be legitimately spent this way. (See Unit XII, Lesson 2, also 8, Ready to Serve Foods.)

8. Ways of buying food:

A. Personal marketing—

(1) Advantages.—The buyer can see the goods, judge their quality, get suggestions, and make selections. She may be able to take advantage of good prices in fresh fruits or vegetables for preservation, etc.

(2) Disadvantages.—The early morning hours which are the best for marketing are also best for other household duties.

Often the market does not deliver goods and the market basket has to be carried. The task of marketing is a heavy one and often uses strength and time which might be better used in other ways.

B. Marketing by telephone can be done satisfactorily if the buyer uses forthought in assembling her order, trades at a reliable store, insists upon good service, and deals with one good clerk who knows her standards.

(1) Advantages.—This method saves time and strength.

(2) Disadvantages.—The buyer can not see the variety of goods, but a good clerk will list the available things and mention interesting items in his stock, thus assisting the housewife in making selections.

C. Mail-order buying.—This method is used in parts of the country which are isolated from large cities or towns and affords a really good way of securing commodities. It should be used only with reliable firms and then only when local stores have failed to meet the prices offered by the mail-order houses.

(1) Advantages.—A saving is often realized because prices are lower, due to the absence of middlemen and retailers in the transaction.

(2) Disadvantages.—It takes trade away from local dealers. It involves transportation and the disadvantage of buying without first seeing the goods. Adjustments for returned goods are sometimes slow and unsatisfactory.

9. Amounts of food to buy.—This depends upon the following factors:

A. Storage facilities (see Unit IX, Lesson 9).

(1) Space.

(2) Cost of ice (for perishables).

B. Ready money available.

C. Keeping qualities of the food.—Foods should be bought in as large quantities as can be used before deterioration. Buy several foods having similar uses in equally large quantities so that variety may be obtained in the diet. Having too large a quantity of one food on hand tends to monotony. It is better to buy nonperishable goods in large quantities. Less perishable fruits can be bought advantageously by the crate if proper storage facilities are available. Some fruits and vegetables deteriorate very rapidly and should not be bought in quantity unless arrangements are made for using them immediately. A material saving may be affected if two or more neighbors pool their buying.

10. Bulk food versus package goods.—This involves the question of cleanliness. The buyer should note the facilities provided in the store for keeping bulk goods clean and buy only those which are

properly protected. In general, food in bulk—that is, in the simplest form—is cheaper than food of the same quality put up in packages. When buying in bulk, women should learn to ask for definite amounts by pound, quart, peck, dozen, etc. A loss is often incurred by buying things by the basket, bottle, pail, or other container. Package goods should be marked with the quantity they contain, and the net weight of the package should be noticed in relation to the cost. The size and shape of the package should be noted. This is particularly true of bottles; the smaller the container the higher the price in proportion to the amount obtained. The following table gives one illustration of this fact:

Relative costs of fat in containers of varying sizes.

[Compiled by Margaret Mumford, University of Missouri, March, 1918, from local prices.]

Fat.	Size can.	Cost.	Cost.	Saving.
			<i>Per pound.</i>	<i>Per pound.</i>
Lard.....	5-pound.....	\$1.53	\$0.306	.....
Do.....	10-pound.....	3.04	.304	\$0.002
Do.....	20-pound.....	6.06	.303	.003
Do.....	50-pound.....	14.90	.298	.003
			<i>Per quart.</i>	<i>Per quart.</i>
Olive oil.....	1-pint bottle.....	.27	2.16	.....
Do.....	1-pint bottle.....	.42	1.68	.48
Do.....	1-pint bottle.....	.72	1.44	.72
Do.....	1-quart bottle.....	1.25	1.25	.91
Do.....	1-quart can.....	1.08	1.08	1.08
Do.....	2-quart can.....	2.10	1.05	1.11
Do.....	4-quart can.....	4.00	1.00	1.16

(See Unit I, Lesson 2, "Breakfast Cereals.") The relatively higher price of package goods may be due to the good will which the trade-mark represents, the cost of advertising the brand, and the labor involved in its manufacture and distribution, as well as the sanitary advantages.

11. Buying food in and out of season.—With increased transportation and refrigerating facilities this question is of less importance than formerly. Canned goods are sometimes used when fresh ones are actually cheaper. The use of hothouse fruits is unnecessary and extravagant, but some hothouse vegetables, such as lettuce, can be used occasionally without undue extravagance. (See Units II, IV, and IX.)

12. Ready-to-serve foods.—Because the buyer pays for the fuel and labor involved in their preparation the price of these foods is high in relation to their food value. The value of the time of the house-keeper and of the fuel used in their preparation should be taken into consideration. The use of baker's bread is an illustration of this point. Baked or boiled ham serves as another illustration. Such ham might be useful in giving variety to the diet, and under certain conditions it is the most economical form in which to purchase it.

The community kitchen idea may be developed to include ready-to-serve food. The markets are full of such goods which were unknown a generation ago. The housewife should use careful judgment in their purchase and use because their convenience often blinds her to their cost and value.

13. Knowledge of weights and measures.—The buyer should be acquainted with standard weights and measures and should occasionally check her purchases by weighing or measuring them. Accuracy on the part of the dealer should be demanded. The following rules are suggestive:

(1) The liquid quart is smaller than the dry quart. (Dealers often using liquid measures for vegetables and other foods which should be measured by dry measure.)

(2) One bushel of potatoes weighs 60 pounds. One bushel of carrots weighs 50 pounds (except in Minnesota, where it weighs 45 pounds).

Weights per bushel of various common commodities differ in the different States. For these figures and other valuable information, consult Circular of the Bureau of Standards, No. 55, Measurements for the Household.

14. Specific suggestions for buying.—These are given in detail in Units II, IV, V, and VI. (See also Unit X, Lesson 7.)

A. Fruits and vegetables.—The consumer should know the sources of fruits and vegetables and the seasons at which they are at their best since these factors affect their price and quality. She should know their keeping properties and reliable tests for quality and ripeness, since these govern the amount in which they should be bought.

B. Milke, cheese, and eggs.—The high food value of these products in proportion to their cost should influence the housewife in including them as an economical source of food.

C. Meat, fish, poultry, and game.—The amount of refuse must be taken into consideration.

15. Conservative buying.—The conservatism of American housewives in the use of food is a determining factor in the high price of food. There are many new, unaccustomed foods on the market which are cheap because of the lack of demand for them. Foods for which there is a great demand are high priced. If women would use all the foods available, they would gain a double advantage—variety in the diet and lower prices on staple goods. This is true of nearly all classes of food. In some parts of the country, sweet breads, liver, etc., are given away by the butcher or sold for nearly nothing. The intelligent buyer studies and takes advantage of these conditions.

METHOD OF DEVELOPING LABORATORY WORK.

This lesson may be conducted as a discussion accompanied by a demonstration. Have the women plan purchases of food for wash day, ironing day, canning time, planning menus which will save time and fuel. Have them plan purchases of food for a family in which the woman is a wage earner and away from home for part of the day. Compare the cost of a ready-to-serve food with the same food prepared at home if the housewife's time used in some other way is worth a definite amount per hour. If practicable, have a reliable grocer give a short talk on the three ways of buying from his standpoint.

Obtain or have the women obtain local prices on bulk and package goods, also fruits and vegetables in quantity. Make comparisons and compute savings. Have illustrative material on hand showing relative amounts, quantities, and prices of bulk and package goods. Do the same with ready-to-serve foods. Investigate local methods of storing and displaying bulk goods. Give figures for cost of one page of advertising in a good magazine. Compare cost of salad oils in bottles and gallon cans.

Prepare list of meat, game, vegetables, and fruits with their best seasons, their sources, tests for quality, ripeness, etc.

Discuss scales and measures found in groceries and markets and common fraudulent practices in their use.

Prepare list of uncommon foods which are available locally or can be made so.

Note fair-price lists as given in the local papers. If fair-price list is not printed the housekeepers should organize to see that it is.

REFERENCES.

United States Department of Agriculture:

Farmers' Bulletin No. 830. Marketing Eggs by Parcel Post.

Farmers' Bulletin No. 703. Suggestions for Parcel Post Marketing.

Department Bulletin No. 267. Methods of Wholesale Distribution of Fruits and Vegetables on Large Markets.

Year-Book Separate No. 738. Cooperative Marketing: Where? When? How?

LESSON 6. HOME PRODUCTION OF FOOD.

AIM.

To suggest ways in which women can aid in the home production of food, and encourage an increased production along the lines best suited to the community.

POINTS TO BE BROUGHT OUT.

1. Reasons why the home production of food should be encouraged :

A. It offers a method of increasing the world's stock of food, especially those foods in which there is at the present time a great shortage.

B. It usually means a reduction in the cost of food for the family.

C. It aids in the matter of transportation. It is highly desirable that every home be as nearly self-supporting as possible.

D. It frequently offers a method by which the housekeeper may add to the family finances by selling any surplus products.

2. Suggested ways by which the housewife may increase the food supply :

A. Home garden.—Waste ground may frequently be utilized for a home garden and with small outlay can furnish fresh vegetables for use in season and a surplus for canning, drying, or storing. The importance of vegetables in the diet makes a home garden a most valuable source of food for the family, and assures vegetables in the freshest possible condition.

B. Orchard or small fruit raising.—Valuable for the same reasons given above. A larger cash outlay is usually necessary, but the investment is permanent and the returns may be enjoyed year after year.

C. Beekeeping.—Requires a comparatively slight initial investment and little time and attention. Furnishes a splendid food which can be used to supplement the sugar in the diet or for canning and preserving. Any surplus can be sold at a good profit.

D. Maple sugar or sirup.—Where there are sugar maple trees available, the making of sugar or sirup is practicable as a source of food for the family, and any surplus finds a ready market at a good price.

E. Poultry.—If properly handled, a flock of hens should furnish both meat and eggs at an economical cost. Poultry may be fed partly on waste scraps from the table, but they must be supplied with additional protein food. It is unwise to undertake poultry raising on an extensive scale without some experience and study, but a small flock may be kept profitably even in a restricted space such as a back yard, with such help as may be had from Government and State bulletins.

F. Pigeons and squabs.—Pigeons are easy to care for, multiply rapidly, and may be raised in sufficient quantities to add considerably to the food supply. In food value, they are similar to poultry.

G. Rabbits.—Rabbits thrive well, multiply rapidly, and when full grown, furnish good meat at a small cost. They may be raised in a small space, and much of their food supplied from waste

material, such as leaves and trimmings of vegetables, lawn clippings, etc.

II. Use of wild foods.—When wild foods which would otherwise go to waste are gathered and used for food, they are adding to the world's food supply, and may be considered with the home production of food. Such wild foods are:

(1) Fruits.—These vary with the locality. Berries of many kinds, grapes, persimmons, plums, etc., may be used fresh or canned, dried, or otherwise preserved for winter.

(2) Greens.—These furnish a valuable addition to the diet. Many varieties of wild greens may be used.

(3) Mushrooms.—Different varieties grow wild in many places. Care must be used in selecting them since the nonpoisonous varieties are similar in many ways to the poisonous varieties.

(4) Nuts.—Nuts are valuable both for their protein and their fat content. They add food value and flavor to the meals. Many varieties grow wild, and may be stored in the fall for use during the year.

METHOD OF DEVELOPING LABORATORY WORK.

This lesson is intended to offer suggestions which the teacher may use in various ways. A general class discussion on home production of food may be held, asking women who have had experience along any line to lead the discussion in connection with that subject and to give specific information which will be of service to other members of the class who are contemplating taking up such work.

If the locality is especially adapted to certain lines of food production, such as beekeeping, poultry raising, and gardening, the class discussion may be supplemented with a lecture by an expert along this line. Some local person may be available for this purpose, or a specialist may be obtained from the extension department of the State agricultural college. The aim of the lesson may be made either to introduce new lines of home production of foods, or to encourage the adoption of improved methods in those lines already undertaken. This must be decided by the teacher, according to the local needs.

REFERENCES.

U. S. Department of Agriculture:

Farmers' Bulletin 936. The City and Suburban Vegetable Garden.

Farmers' Bulletin 934. Home Gardening in the South.

Farmers' Bulletin 1031. Fig growing in the South Atlantic and Gulf States.

Farmers' Bulletin 937. Farm Garden in the North.

Farmers' Bulletin 643. Blackberry Culture.

Farmers' Bulletin 728. Dewberry Culture.

U. S. Department of Agriculture—Continued.

Farmers' Bulletin 887. Raspberry Culture.

Farmers' Bulletin 901. Everbearing Strawberries.

Farmers' Bulletin 447. Bees.

Farmers' Bulletin 516. Production of Maple Sirup and Sugar.

Farmers' Bulletin 528. Hints to Poultry Raisers.

Farmers' Bulletin 889. Backyard Poultry Keeping.

Farmers' Bulletin 767. Goose Raising.

Farmers' Bulletin 684. Squab Raising.

Farmers' Bulletin 697. Duck Raising.

Farmers' Bulletin 791. Turkey Raising.

Farmers' Bulletin 496. Raising Belgian Hares and Other Rabbits.

Farmers' Bulletin 796. Some Common Edible and Poisonous Mushrooms.

States Relations Service Bulletin 464. Lessons on Poultry for Rural Schools.

Federal Board for Vocational Education:

Vocational Rehabilitation Series No. 37. Beekeeping.

LESSON 7. COMMUNITY KITCHENS.

AIM.

To discuss the types and methods of operation of community kitchens and to investigate the need and possibility of establishing a community kitchen in the community.

POINTS TO BE BROUGHT OUT.

1. Value of a community kitchen:

A. Through centralization it is able to conserve food, fuel, labor, and energy.

B. It can, when properly managed, furnish a product of a better grade at a less cost than can be prepared in small quantities in many homes.

C. By concentrating the preparation of a large quantity of food in the hands of a few people it gives many housekeepers extra time which they may use for other purposes.

D. It encourages the growth of a community spirit and cooperation among individuals.

E. Frequently it is under the supervision of a trained expert, who is able to give valuable suggestions on food to the women of the community who have had little or no training along this line.

2. Types of community kitchens:

A. Educational kitchen for demonstrations of food preparation where women may bring their own materials to prepare under supervision in order to learn the best methods.

B. Canning kitchen.—This may be of the type which takes care of surplus or donated products and uses them for community or philanthropic purposes, or one which combines this type of work with canning by individuals for themselves on shares or order.

C. The dehydrating kitchen, which may be of two types similar to the canning kitchen.

D. A combination of a canning or drying kitchen with a community bakery for the preparation of cooked food for home consumption.

E. Cooked food center for the preparation, sale, or distribution of food. This may supply food for home use or have cafeteria service in the building, or both.

3. Organization:

A. Must be established in response to a definite need and must have the active backing of a sufficient number of people to make it a real community project.

B. It may be organized by:

(1) A club or other permanent organization already in existence.

(2) An emergency organization.

(3) A special committee representing the municipality or made up of individuals specially selected.

(4) Local organizations cooperating with school board.

C. There should be an executive chairman in charge of the kitchen with chairmen of subcommittees as her assistants. These subcommittees might be:

(1) Census and publicity.

(2) Location.

(3) Finance (source and expenditures).

(4) Equipment and installation.

(5) Supplies (source and collection).

(6) Kitchen management.

(7) Disposal of finished product.

4. Methods of financing.—A working capital is essential, the amount necessary varying with the type and size of the kitchen. It may be obtained from:

A. Individuals.—Frequently the easiest way to raise the necessary money, but may prevent the kitchen from being a real community project.

B. Emergency funds.—Kitchens founded primarily for the saving of food products are within the province of such organizations.

C. Membership fee from each family using the kitchen.

D. Loan from a local bank or business men.

E. School board.—In many communities the school board would lend the school kitchen already equipped and allow the domestic

science teachers to give a part of their time to supervise the work.

5. Housing.—For convenience, the kitchen should be located in some central place. It might be a school kitchen, a church kitchen, part of a grange hall, a vacant store, a room in the city hall or courthouse, a space in the market, or a private home.

6. Equipment.—This varies with the type of kitchen and with the amount of work which is carried on. The best results are accomplished with modern equipment which cuts down hand labor and accomplishes results with a minimum of time and effort. The equipment may be secured by:

A. Purchase with a part of the original capital.

B. Loans or donations by local business firms.

C. Original equipment of a school kitchen with slight additions.

7. Methods of labor:

A. Volunteer women who donate their services.—This is satisfactory only when under a careful system. An experienced woman should be in charge. If any woman is absent, she should be requested to furnish a responsible substitute. Supervision of the work from time to time by a woman with expert training is extremely desirable.

B. Volunteer women who work on a time basis and are paid in the products of the kitchen. The system of work should be as above.

C. In general, the most satisfactory method is to put a regularly paid supervisor in charge with paid helpers. The supervisor should be a woman with training and executive ability.

8. Disposal of product:

A. Sold either to stockholders or to the public at large, to be carried home or served in a cafeteria in connection with the kitchen. The delivery of an entire hot meal in special containers is a recent variation which is extremely successful in some communities.

B. Disposed of largely in payment for labor (usually a canning or dehydrating kitchen).

C. Disposed of at public sales.

D. Sold on shares to grocers or individuals furnishing materials.

E. Donated to charity.

9. Possible variations of community kitchens:

A. Community bakery.

B. Soup kitchen, to supply soups or stews to homes and schools.

C. Exchange for sale of homemade products.

D. Community markets for fresh fruits and vegetables, eggs, and butter.

E. Canteen service to deliver hot food to factories or offices at noon.

F. A food-facts center with information on general food subjects.

G. A canning and drying plant to salvage the waste from city markets or to save the surplus from school gardens.

H. A bureau to supply volunteer labor (Boy Scouts, Camp Fire Girls, etc.) to help in the harvesting of food crops which may or may not be turned over to the kitchen.

METHOD OF DEVELOPING LABORATORY WORK.

This lesson may be given as a lecture and class discussion. In connection with it a survey should be made of the community to determine the need for some type of community kitchen, either seasonal, as a canning or drying plant, or permanent, as an establishment for supplying cooked food or as a center for food training and information on foods. If sufficient interest is shown, the project might well be undertaken by the members of the class as a means of putting into practical use the instruction which they have received in the course.

REFERENCES.

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Farmers' Bulletin 916. A Successful Community Drying Plant.

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Bulletin No. 1. Statement of Policies.

*Bulletin No. 2. Training Conscripted Men for Service as Radio and Buzzer Operators in the United States Army (International Code).

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Bulletin No. 29. (Reeducation Series No. 5.) Treatment and Training for the Tuberculous.

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Bulletin No. 31. (Trade and Industrial Series No. 6.) Training Courses in Safety and Hygiene in the Building Trades.

Bulletin No. 32. (Reeducation Series No. 6.) The Agricultural and Industrial Community for Arrested Cases of Tuberculosis and Their Families.

Bulletin No. 33. (Reeducation Series No. 7.) Productive Vocational Workshops for the Rehabilitation of Tuberculous and Otherwise Disabled Soldiers, Sailors, and Marines.

Bulletin No. 34. (Commercial Series No. 3.) Commercial Education (Organization and Administration).

Bulletin No. 35. (Home Economics Series No. 3.) Use and Preparation of Food.

All communications should be addressed to

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* Emergency war training for conscripted and enlisted men.





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